

# SUPPLEMENT.

# The Mining Journal, RAILWAY AND COMMERCIAL GAZETTE.

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

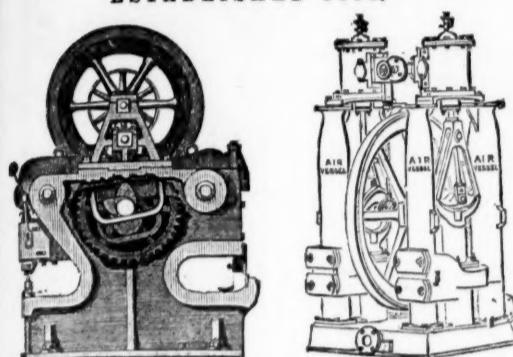
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LONDON, SATURDAY, DECEMBER 29, 1877.

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PARIS,  
BRONZE MEDAL, 1867.



ORDER OF THE CROWN OF PRUSSIA.



FALMOUTH,  
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A DIPLOMA—HIGHEST OF ALL AWARDS—given by the  
Geographical Congress, Paris, 1875—M. Favre, Contractor, having  
exhibited the McLean Drill alone as the MODEL BORING MACHINE  
for the ST. GOTTHARD TUNNEL.

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mywyn, and Ystumtum Mines, in Cardiganshire; Mr. Beaumont's W.B. Mine, Darlington; also Mr. Sewell, for Argentiferous Copper Mines, Peru; the Bratberg Copper Mines, Norway, and Mines in Italy, Germany, United States of America, and Australia, from all of whom certificates of the complete efficiency of the system can be had.

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Mr. BAINBRIDGE, C.E., of the London Company's Mines, Middletons, in Teesside, by Darlington, writing on the 20th March, 1876, says—"The yearly profit on our Narthead waste heaps amounted last year to £600, besides the machinery being occupied for some months in dressing ore-stuff from the mines. Of course, if it had been wholly engaged in dressing wastes our returns would have been greater; but it is giving us every satisfaction, and bringing the waste heaps into profitable use, which would otherwise remain dormant."

Mr. T. B. STEWART, Manager of the Duke of Buccleuch's Mines, Wanlockhead, Abington, N.B., writing on 20th March, 1876, says—"I have much pleasure in stating that a full and superior set of your Ore Dressing Machinery has been at work at these mines for fully a month, and each day as the moving parts become smoother, and those in charge understand the working of the machinery better, it gives increasing satisfaction, the ore being dressed more quickly, cheaply, and satisfactorily than by any other method."

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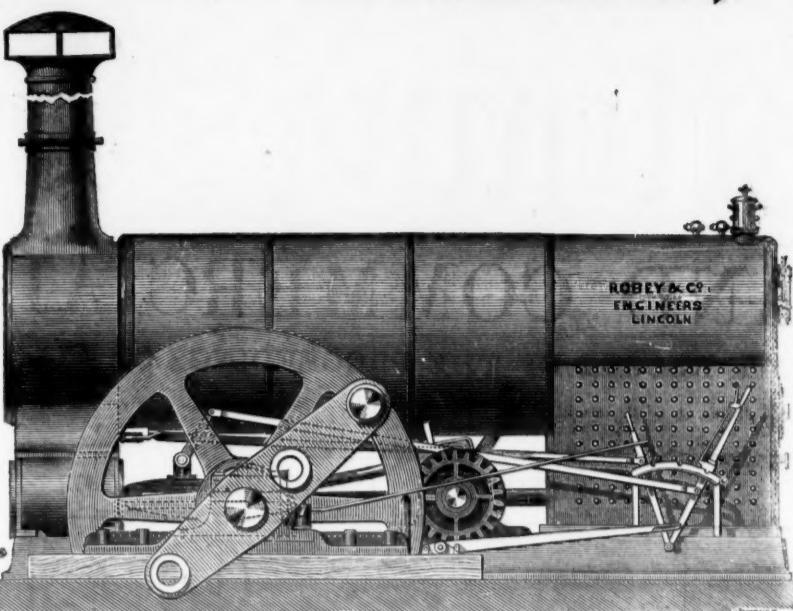
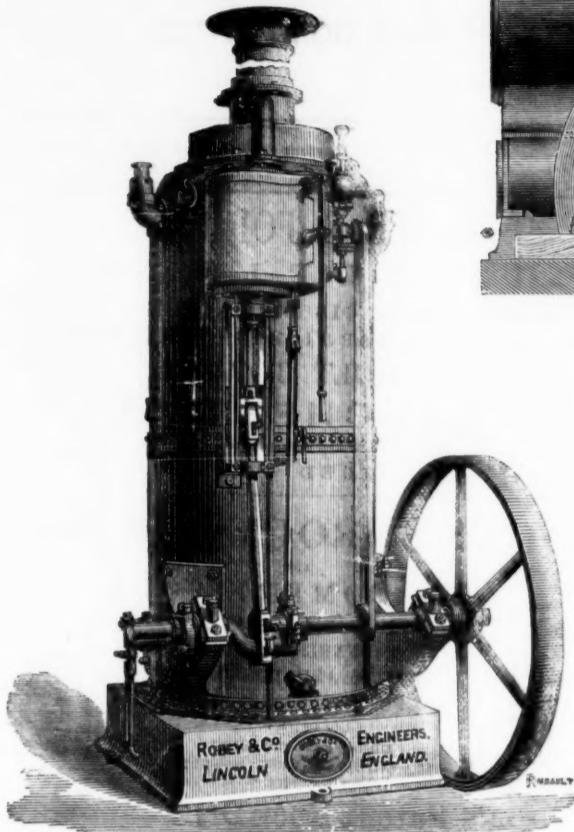
Mr. MONTAGUE BEALE says—"It will separate ore, however close the mechanical mixture, in such a way as no other machine can do."

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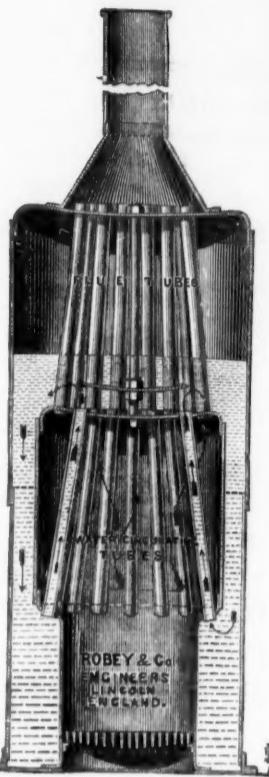
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## Original Correspondence.

## THE GREAT SILVER DISCOVERIES IN ARIZONA.

Sir.—I recently forwarded you, for reviewing, a pamphlet on the Southern Part of Arizona, bordering on the Mexican line. It contained a large and new map of that territory, and reports by several well-known mining engineers. This pamphlet was published by the Aztec Mining Company of San Francisco, who are operating in the Santa Rita Mountains. I have had occasion to judge of the nature of the company's properties. They have at their office a fine collection of ores from their different claims, and judging from these, I believe they will have a great success. They have engaged an Englishman as their principal metallurgist—Mr. W. T. Rickard, F.C.S., of London—who has had great and varied experience in the working of ores in Chile, Peru, England, and Servia. This very fact alone proves how practical Americans are, and what good common-sense they show in the management of their companies. (Allusion to this fact was made in the Emma pamphlet three years since.) They do not place a mining man only to look after their interests, but an educated and scientific person to look after the metallurgical and chemical departments. No wonder they make a success where English mining companies cannot do so, as they are generally badly organised in that respect, at any rate, most of those in the United States.

THE RICHES OF NORTHERN ARIZONA.—Nowhere in any part of the world, except Chile, have I come across such rich silver ores, I do not mean specimens, but lots of 3 or 4 tons at a time sold here in San Francisco having realised some \$20,000 per ton; in fact, almost pure bar silver, such as we have produced in Chile for 25 years. One piece alone weighed 1200 lbs. from this mine, and it is called the Stonewall Jackson, Globe district, Arizona.

THE LITTLE MAC (General Maclelland).—The ores of this mine are on exhibition at the Pacific and Refining Offices in Montgomery-street, San Francisco. The nature of these ores is precisely those found in our Chilean and Bolivian mining districts; they are chloro-bromides of silver; and as to richness, I never before saw anything equal to them in the United States. They assay \$8 to \$10,000 per ton. Mark you, Mr. Editor, no notice will be taken of these discoveries in England until it is too late to buy on bed-rock prices, as I advised my friends in England, when writing from Utah, in 1871. When I offered the Flagstaff Mine of Utah for 12,000/-, others were proposed to my London friends at equally low prices in proportion. In four months it will be too late to purchase a rich mine in Arizona on bed-rock prices.

I have again repeated what I wrote to my friends in London when proposing the Flagstaff for 12,000/- Gentlemen, make up a purse of 10,000/-, and appoint somebody to get you a good mine in Arizona.

San Francisco, Dec. 4. HENRY SEWELL, M.E., F.R.G.S.

## TASMANIAN TIN FIELDS—No. III.

We now come to the Belmont Company. It is situated 6 miles west of Thomas's Plain, and is going to it along the track from whence we cross a pretty high range of hills on to the Cascade River, and, passing by H. H. Gill's claims and those of the Atlas and Globe Companies, reach Heaps' Store on the Cascade. About half a mile south-west of this store lie five sections taken up by the Belmont Company. The claim is very hilly, and on it is situated Bell Hill—a remarkable eminence, 2500 ft. high—from the summit of which on a clear day a splendid panorama of the country can be obtained. On a saddle of the hill not far from the peak two lodes crop out, about 160 ft. apart. The lode-stone is granitic porphyry, with a little tin ore on the faces and cleavage; the yield would be from 1 to 2 per cent. of tin from the narrow parts, or where the lode is about 1 ft. wide. Two shafts have been put down 200 ft., and the other 120 ft. in depth, and drives put in from them to test the lodes. The thickness of lodes varies from 28 ft. to 6 in. No. 1 lode, runs almost east and west; this was 10 ft. wide when found on the surface, and a shaft has been put down 200 ft., at 80 ft. deep, with a drive 50 ft. west, the lode being 10 ft. wide there, and of no value; the men were driving eastward, and had gone about 110 ft. on a lode from 8 to 12 in. wide. In sinking the shaft 20 ft. down a horse of decomposed granite came in, and split the lode. West of No. 1 shaft, 350 ft. distant, is a second shaft, 120 ft. deep. A drive has been put in eastward, the lode pinching to 1 ft. wide, and then widening. On the surface it was 20 ft. wide, and 28 ft. at the 40 ft. level, but of no value at any point seen from this shaft. South from this lode, 160 ft. distant, and running parallel to it is a second lode, similar to it in character and quality. On the hill-side below, 450 ft. in a direct line, 30° east of north, a tunnel is put in to No. 1 shaft, and across to the south lode, so far with no good results. There are also some runs of wash-dirt in the claim, which have evidently been deposited in the past from the lodes above. The prospects generally are not encouraging. The yield from this source is from 4 to 6 cwt.s. of tin ore per week, with six men. Water is, however, unusually scarce here, and to supply the quantity required for all purposes a race 2 miles and 10 chains long has been cut from the hill to the western branch of the Cascade river, which it touches about half a mile below the Thistle Company's claim. There are 110 chains of fluming, 2 ft. 3 in. wide, the rest of the distance being an open cutting, which cost the company 111. 10s. per chain for the fluming, and 3d. 10s. per chain for the cutting.

To the north-west the tin-producing country runs 6 miles north-west of Belmont, over the properties of J. R. Scott (Branholme) and James Scott (Legerwood), in Ringarooma, several sections being taken up and in work in that vicinity, the principal being those of Pearce's Ruby Flat Company, the Standard Company, and the Branholme Company, but are not doing much in the way of profits. Returning now to the western side of the district, we come to the Blue Tier Mines. The Blue Tier is a mountain range, about 15 miles long and 2600 ft. high, running north-east and south-west, and covered with similar rich soil and virgin forest to that already described. The top of the tier is a sort of plateau about 2 miles across, from which rise several small peaks, and along its western side are numerous small streams, which form the heads of the Buchanan river, Niagara Creek, and Blue river, all flowing north and west into the Ringarooma river. On the eastern side rises the Groom river, falling into the George, the Ransom, falling into the Groom, and the Swan and Laffar branches of the Ransom. At the north-eastern end the Anson river takes its rise, and falls into the Bay of Fires; and further north are the heads of the Great Musel Roe river, the country about there being very rough. Immediately after the discovery of tin ore on the spurs of the Blue Tier by Messrs. Chapman and Kennedy Messrs. Traill and Waganecht cut a track from them to the tier, and were followed by Messrs. Iles, McGough, and others, the tin here being found in August, 1875. and now the sections applied for cover the whole of the Blue Tier. As half of them are not surveyed cannot give the area, but have reason to believe it is between 12,000 and 16,000 acres. Out of this, however, but very few sections are worked.

Starting from a point on the Government road, nearly opposite Mr. Trowbridge's house, a cart-track has been cleared, I believe by the Lottah Company, along the foot of the tier crossing the Ransom and Laffar rivers more than once, and reaching in about 3 miles the Lottah Company along the foot of the tier, crossing the Ransom and Laffar rivers more than once, and reaching in about 3 miles the Lottah Company's sections, from whose workings the ore is brought down in sledges by bullock teams. A very bad pack-track then commences, and is cut to the other claims on the top of the tier. Its natural difficulties being supplemented by the fact that it has to rise nearly 2000 ft. in a few miles. At the foot of the tier, on the Laffar, are two sections held by the Laffar and Norwegian Company, who also hold sections on Thomas's Plain. They have been at work here about six months, and commenced close to the river, on a small creek, where a little patch of wash-dirt was found, working up the narrow ravine on the hill-side, down which the creek came, they took out about 1½ ton of tin. The bottom is granite partially decomposed, above which is a thin layer of pipe-clay. The first claim at work on the top of the tier, on the eastern water-shed, is that of the Lottah Company, who hold four or five sections, and are

working the head-water of the Laffar. The usual amount of dead-work has had to be done here, as everywhere else, and they have been getting out tin since the commencement of 1876; 15 men are employed, and two sluice-boxes, which turn out about 15 cwt.s. of tin per week. Next to them, on the western water-shed, are Waganecht's sections, two in number, now worked by the Full Moon Company. This was a co-operative party of five, and is the richest claim in the district, having averaged about 8 tons of tin per month for the last two years, with 11 men employed. They have about three-quarters of a mile of this creek. The stripping all over the Blue Tier is very light, running from 1 to 2 ft. in depth. West of the Lottah Company are six sections, known as the Blue Tier Mining Company, otherwise Webb's, on which sluicing operations have been carried on for some time, and several tons of tin returned. South of these sections lies the Marie Louise claim, containing about 14 sections, running back to Chapman and Kennedy's sections. West of Webb's come three sections held by Stratton, Iles, and others—a co-operative party. They have a good depth of wash-dirt, about 1 ft. 6 in., and have got out several tons of tin. West and southwest of these lies the Star Company's claim. This company were among the first to commence work here. They employ eight men, and are getting on an average about 15 cwt.s. per week. South and west of this company lie the sections of the Emu Company, already mentioned.

We will now return to the claims running south-east from Branholme, on which there are about 200 men employed. Leaving the homestead, and proceeding for some distance down a fine avenue, bordered by young English trees and pines, planted by Mr. J. R. Scott, we turn to the left, and passing off the basalt on to granite again come to the first claim—that of the Branholme Company, on the Branholme estate, only half a mile south-east of the homestead. The holders have a lease of five acres, and pay a royalty on every ton of tin ore raised—the only instance of the kind that I heard of in the colony. The claim was taken up in January, 1876, and they have worked up some distance, the face now being 30 ft. wide. The stripping varies from 2 ft. in the creek to 7 ft. on the sides, and the wash runs from 6 in. to 2 ft. in depth; eight men and one sluice-box are employed, and they turn out about 20 cwt.s. per week. Half a mile further up the creek, just outside the boundary of the Branholme estate, and, therefore, on coarse land, is the Hit or Miss Company's claim, of 120 acres. Work has been carried on here for several months, and operations were commenced in a blind gully, falling into the main creek, about two chains having been worked up. The run of wash was narrow, from 1 to 2 ft. in depth, with from 2 to 6 ft. of stripping, and five men, with one box, raised about 7 cwt.s. of tin ore per week. Three chains south of this is another face in a small creek, and 2½ chains worked up, the wash varying from a chain lower down to 20 ft., the present face stripping running up to 6 ft., the tin being rather coarse; 7 tons of ore in all had been raised up to June 7, the date of my visit. Proceeding along the western side of the main creek still south-east brings us to the Trio Company's claim of 40 acres, not quite 2 miles from Branholme. Work had been commenced here about the beginning of May, 1876, and four men and one box were at work close to the edge of the creek, the run of wash averaging from 1 to 2 ft. in depth of low quality, with 4 ft. of stripping, where the face is 15 ft. wide. The wash runs into the bank on the west side, and on a head widens into a flat. Only 8 cwt.s. of tin had been raised for the past week. The stones in the wash-dirt are very rough, and there are many boulders, some of them very large. Eastward across the creek, and fronting on it, is the only claim at work on that side—that of the Pearl Company, who hold three 80-acre sections fronting on the creek, and running back towards the high range mentioned. A face has been started at the main creek, and carried up a narrow gully eastward from it, the run of wash-dirt being only 10 or 12 ft. wide. Four men and one box were at work, but more men were to be put on shortly. Passing on south-east from the Trio Company, over an extensive flat covered with gum and currant-trees principally, we come to the Tamar Company's two sections, fronting on the main creek, or, as it is here called, Pearce's Cascade Creek. The workings are in the upper section, upon a small creek in part of the flat and made rises. We have come over the largest extent of made ground I saw along this line. The wash runs about 1 ft., stripping 3 ft., and seven men with one box averages 20 cwt.s. of tin per week.

Adjoining this section on the south and south-east are six sections, mostly fronting on the main creek to the south-east, held by Pearce's Ruby Flat Company. The first workings are some distance up a creek falling into the main creek, and here a good deal of work has been done. The wash runs from 6 to 18 in., the stripping from 1 to 6 ft.; seven men with one box get out from 20 to 25 cwt.s. of tin in one week. During the eight months this claim has been working 40 tons of tin have been raised. A second box has lately been started with five men lower down near the Tamar Company, in the flat of which Pearce's Company has a large share, with no increase in the returns.

Proceeding on through the Myrtle Forest over the boggy and slippery pack-track, we come to a 20-acre section, known as Moore's Fancy Flat, south-east of and adjoining Pearce's Ruby Company. Mr. J. A. Moore has got out 4 tons of tin in six months from a creek falling into the main creek, still on the south side, as all the workings yet mentioned are, except the Pearl Company. The wash-dirt runs from 6 in. to 2 ft. in patches, and stripping from 2 to 6 feet. Adjoining this claim south-east is that of the Golden Age—an 80-acre section. Mr. Johnson has got out during twelve months' working 32 tons 8 cwt.s. 27 lbs. of tin ore, but has now let the claim on tribute to parties of working men, giving them 25c. per ton on the claim for all tin raised. Three parties were then at work, of six men in each party. Joining the Golden Age on the south-east are four 80-acre sections held by the Standard Company, and here a good deal of work has been done on the main creek and creek falling into it. Operations were commenced in November, 1875, by Mr. G. Smith, and 16 tons of tin have been raised. The general run of stripping is from 1 to 6 ft., and the wash-dirt varies from 6 in. to 3 ft. in places, some of it being clayey. The company, however, let the claim on tribute, in a similar manner to the Golden Age, but only giving 20c. per ton for the ore on the ground. Three parties of six men each have started work, who after trying it for some little time found it would not pay, and abandoned it. North of the Standard Company, across the main creek, and on the top of the hill on the other side, is a 40-acre section belonging to the Surprise Company, where some work has been done, but operations are now suspended. Close to it is Genat and Paterson's sections—the Poor Man's Turn. They had four men at work on a creek falling into the north side of the main creek, and have got out 1 ton 3 cwt.s. 2 qrs. 15 lbs. of tin. Here also they have ceased to work. A great number of sections are applied for from here back north-west of the Tamar Company, but no work has been done on any, and I should say never would be. Eastward of the Standard Company is a quantity of vacant barren ground, but adjoining it on the south is a 40-acre section, held by the Nelson Company. There is a little wash-dirt here, and about 3 tons of tin ore raised. To the south-east, and about half a mile away is McDonald's 40 acre section. A start has been made close to a creek called Nuggety Creek, where there is a patch of good wash-dirt; stones very rough, and full of specimens. The creek runs north-east and south-west, and on the northern side of it is a granite hill. Running up the face of the hill is a small patch of payable wash-dirt. The whole of the top of the hill is a mass of broken granite boulders, for some hundred yards in length; some of the boulders show a face of tin ore. This claim is now known as the City of Paris, south of which comes Easton's section—the Sailor's claim—where a little work has been done in the creek, and all the tin I can find that has been returned from this claim is 2 cwt.s. 3 qrs. 13 lbs., which is now abandoned. South of and adjoining this claim comes that of the Dorset Company. Work was commenced in Nuggety Creek, which falls into the Dorset river on the east side. The wash-dirt runs about 18 in. in depth, and from 1 to 2 chains wide, stripping from 2 to 6 ft. deep. About 5 chains of the creek have been worked up, and some 7 tons of tin ore raised. The ore is very coarse. Here operations are suspended. Round the Dorset Company, on the south and east, there

is a quantity of coarse barren rocky ground vacant—and this is the last claim along this side.

In describing the three last I have sketched their position without mentioning the road I had to pass over to reach them, but it is terror. After leaving the Standard Company the pack-track passes over an immense hill, one of the largest in the district, it being about 3 miles from the foot on one side to the bottom on the other.

We have now described the tin-bearing district of Upper Ringarooma a, with a few exceptions, which I purpose giving in the statistics to follow. On the north this district is bounded by the Ringarooma river, and on the west partly by that river and partly by the Dorset. On the south is a great granite range, and on the east the Blue Tier. Through the centre of this district running from south to north flows the Cascade river, which rises in a plateau near the foot of Mount Victoria, and runs down the face of the big range. We now turn our faces eastward and proceed for a mile down the muddy road which was cleared to the Dorset claim. In the vicinity of the river there is great deal of bastard sandstone visible. A hundred yards past where the Standard track comes in on the left, and turning to the right from Butt's road, a pack-track appears 1 mile from the ford; and following it we ascend an almost interminable hill, the granite rock and Myrtle and Sassafras Forest, with patches of gum-tree, which soon begin to show. The hill is an immense one, and very steep. Anyway it is a terror to both men and horses; and after the top is gained the track winds about a good deal over low rises in a sort of table-land before the actual descent is commenced, the general direction being still east. The road is in a fearful state of slush and bog-holes, the pack-horses sinking at times up to the saddle-girths. The same state of things with regard to roads continues throughout the whole tin district. We now cross the Dorset river, and make the best of our way to Mr. George Fry's farm, where we were most hospitably received and entertained for some days, which will be our next starting point.

J. MUFFORD.

Sticker, Cornwall, Dec. 21.

[To be continued.]

## FLAGSTAFF MINING COMPANY.\*

SIR.—As a large number of shareholders have written me, since the issue of my circular of December 15, asking me the reason why I have allowed so long a time to elapse before informing them of the conduct of Messrs. Harvey and Pearson, I desire through your next Journal to state that as those gentlemen had entered into the "smelting contract" and the "lease of the mine" to Mr. Hunter it will be apparent that I could not consistently with the interests of the shareholders take steps to get rid of one or either of them so long as Mr. Hunter was in possession of those documents, the condition of the issue of the last-named resting entirely on a verbal understanding; while with respect to Mr. Pearson's actions in Salt Lake City (at the time the lease was transferred by Mr. Hunter in July last), even their general nature was but slightly known to me, nor was it until Mr. Pearson's return to London, the latter part of August.

When the documents and quarterly statement sent to the board by the present lessor (quite recently received) put me in possession of certain additional facts, and afforded certain confirmation, I then for the first time felt to be in a position to move in the matter, and I have lost no time in taking action—an action aimed wholly in behalf of the interests of the share and debenture holders. M. C. VINCENT.

Strand, Dec. 19.

\* The sense of some portion of Prof. Vincent's letter in last week's Journal having been materially altered by erroneous punctuation, it is repeated as the readiest means of correcting the inaccuracy.

## CONDES COMPANY OF CHILI.

SIR.—Public companies must expect public criticism. From last week's Journal we learn that this company, like too many others, has got into difficulties. To whatever cause this unhappy state of things may be attributed, it is not questionable as to whether or not those entrusted with the management of the company's interests abroad—the working of argentiferous gold and of silver-lead mines—were judiciously and disinterestedly selected. One of them, I am informed, was a captain in one of the copper mines in the neighbourhood of Redruth, Cornwall, and that the other had been employed in a similar capacity, also in a copper mine, in the eastern part of the same county; it is, therefore, but reasonable to conclude that, having been accustomed only to copper mines, the first time, perhaps, that either of these gentlemen ever saw a lode or vein of the ore of the precious metals, after his arrival at the company's mines in South America. Yet no sooner has one reached the Argentine Republic than he is directed to proceed into Chili, a distance of some 1000 or 1500 miles, to inspect, appraise, and report upon a silver-lead mine, for the purpose of its being purchased or rejected by his employers. The report being corroborative of that of the vendor of the property, the purchase was effected. But, favourable and encouraging as was the report, by some mysterious means the riches represented have not been forthcoming. The management of these silver-lead mines, in a country where Spanish is the only language should also, in my opinion, have been confided to agents who can speak and write the language. Whether those appointed could do so or not I am not aware, but I maintain that in all such cases services of agents would be far more valuable when they are efficient Spanish scholars. They should also be good mine accountants, to check all balance-sheets before they are sent home.

Dec. 26.

G. G.

## GALLOWAY'S COAL-DUST THEORY.

SIR.—Your correspondent "Carbon" must indeed be an "original" if he for an instant imagines that Mr. Galloway's coal-dust theory is original. It is much older than Mr. Galloway, very much older than "Carbon's" grandfather, and, moreover, is perfectly well understood by competent and practical miners. When Mr. Galloway has had more experience in fiery mines (for which purpose, at his own request, he was removed to South Wales) he may be enabled to enlighten us as to causes of explosions, but in the meantime it is unworthy and will be futile to attempt to bring his name into prominence by anonymous correspondence. So long as these attempts are confined to such prints as the Glasgow Sentinel they may not do much harm, but when they come to appear in a respectable Journal like your own the "Engineer" may be hoist with his own petard."—Dec. 20.

NOBRAK.

## SAFETY APPARATUS FOR MINE LIFTS.

SIR.—Scarcely a week passes without some new apparatus being noticed for preventing the fall of the cage in mines in the event of the breakage of the rope, and although I admit that many of them display considerable ingenuity I think they are all wanting in the simplicity of Ayton's, Nyst's, and others of that class—that is to say, arrangements in which the weight of the cage is made to stop the descent. It will be remembered that in Ayton's the most simple probably of all the winding rope pulled the catch which supported the cage into the horizontal position, so as to permit the bolts to move free of the guide rod. This was, of course, the normal condition during the ascent and descent of the cage, but immediately upon breakage there was nothing to support the cage, and consequently it fell, the whole weight of the cage assisting to secure a firm grip. Nyst's cage was not widely different, but the catches pressed out latterly on to the guide rods, the consequence being that in the event of the rods not being perfectly true to gauge there was most unpleasant jerk calculated to do scarcely less damage than the break itself.

Now, I recently saw some experiments tried with a catch, which may be regarded almost as a modification of Ayton's, or perhaps it would be more accurate to say an enlargement. The horizontal iron bar of the Ayton system is affixed both at top and bottom of the cage on each side, and they are connected by four saw-shaped plates, two connecting the upper and lower horizontal plates on each side. The result is that upon the breakage of the rope the weight of the cage is brought to bear, not merely upon four smooth bolts, but the rod is but very slightly damaged, and the result was altogether satisfactory.—Dec. 24.

SAFETY.

## THE BUYING AND SELLING OF MINES.

SIR.—An article with the above heading appeared in last week's Journal, in which it is stated that Messrs. Black, of Chesterfield, purchased the Renishaw Colliery, in 1873, for £30,000, and shortly afterwards sold it to the Boythorpe Colliery Company, of which they were directors, for £100,000. A trial, it seems, resulted to recover back the difference paid by the Blacks and what they sold the colliery to the company for, as it turned out a bad bargain. In the hearing before the Vice-Chancellor you state that evidence was given for the defendants by Mr. Hedley, who said he had an extensive business as a mine valuer, to the effect that during the negotiation he was instructed to visit and value the Renishaw Colliery. He said he did so, and valued it at £173,750! Now, Sir, I should like to know if he is the Mr. Hedley who has valued so many collieries

for the purpose of assessments in the Cardiff and other Unions in South Wales, as well as in many other parts of the kingdom; perhaps some of your readers can furnish the information.

## SOUTH WALES.

## ELECTRIC LIGHTING.—No. V.

**GENERAL REMARKS.**—The first trials made to utilise electricity as a source of light took place long before the invention of the apparatus called "Magneto-Electric," and for the calling forth of this wonderful element Bunsen's batteries were preferably patronised; but then the electric light was only shown as a curiosity, and that very rarely. The process was too expensive to enable anyone to think that any practical application of it would be attempted. With the invention of the magneto and dynamo-electric apparatuses came the idea of applying electricity to useful purposes, for it was felt that some chance of success was thereby put into existence. With both battery and apparatus, however, the necessity was existing of regulating the space between the two pencils of carbon, and to keep them always at the same distance from each other until consumed—to that end some more or less complicated, more or less ingenious, contrivances were devised, and called "regulators." Their duty was and is to gradually push the carbons towards each other at a speed proportionate to the speed of combustion—in fact, they need keep the carbons continually within the same distance from each other, and, therefore, they need be continually acting. It can therefore be guessed that the carbons being always on the move the light can never be steady.

Several improvements have been attempted on these regulators, but they still retain very serious drawbacks; all of them can be classed in two series—No. 1 contains the regulators, with springs already fitted; No. 2 acts by specific gravity. It is only necessary to take the best one out of each series—that of Foucault-Duboscq in the first, and that of Serrin in the second. As to their special description there is no use of giving it; this review having more of a practical than a scientific purpose, it will be sufficient to describe their defects. The regulator, Foucault-Duboscq, can be used either vertically or inclined, and this in itself is a great advantage over the second, but with it two special springs have to be fitted, one acting so as to bring the carbons closer together, and the other further from each other. The strength of one spring has to be proportionate to that of the second, and then both have to be regulated in proportion to the force of the current, operations which are by no means easy, and moreover, they can be thrown out of proper action by a change in the force of electric current. Whatever care may be taken this regulator, and those acting on the same principle, are decidedly, practically speaking, inferior to the second system. The regulator Serrin has no springs acting on the carbons; nevertheless, it requires a certain delicate attention to have the one spring regulating the force of attraction of a special anchor by the electro-magnet, and keep the whole well balanced. When this spring is carefully placed in its proper position the march of the carbons is by far more regular than with the preceding one, only the least change in the force of the electric current throws the apparatus out of gear. Both systems are complicated, very sensitive, and therefore liable to get out of order; they are costly, and again, to act as properly as possible, they require to be regulated before each, and very often in course of use by a skilled employee.

Not one regulator, even that of Foucault Duboscq, which can work at an inclined angle, can support the least shaking; all are voluminous. After a period of one hour, more or less, they get so warm that they cannot be touched by the hand near the carbons. No regulator can, on account of the length of the carbons, last more than two to three hours, when it has to be replaced by another ready at hand, for it must have time to cool before new carbons can be adjusted to it. Besides, as it has been said above, the carbons are constantly on the move, and the light, being thereby always disturbed, is trying to the eyes; and, lastly, it is impossible with regulators to change the intensity of the light according to requirements; it is *tout ourien*, and only one focus can be had out of each circuit. Notwithstanding their drawbacks the regulators, however, have found their way into a certain number of manufactures, where they have rendered great services, and permitted certain delicate works to be performed by night as easily as in daytime, and they have effected such a saving over gas that they superseded it entirely. Lately, however, a bolder and more pretentious, no less meritorious for all that, attempt at perfection has been made, and it has resulted in the introduction of an entirely different system of employing the electric light; this attempt has taken place in the very heart of Paris, and in show rooms where not only has the light, whatever it may be, to be of superior quality so as to facilitate the choice measurements—in fact, all the operations inherent to a retail trade on a gigantic scale—but has, as a primary reason of its adoption, to increase the facility of that peculiar trade. The show rooms here referred to are the well-known Louvre. The result has given entire satisfaction; the light cannot be better compared than to an intense blue moonlight.

As electric light preserves their natural colours to all objects and substances, it is peculiarly well adapted to help the choice of goods, the colours and modes of which have to do with fancy. The result of the trial has produced a general sensation, and it was felt that through the new system electric light had made a great step towards perfection. Even public opinion foresaw that but a small step remained to be made to see this system superseding gas everywhere. The inventor himself should not have jumped so quickly to an almost-for-gone conclusion, and most certainly had not the slightest desire to disturb the equanimity of vested interest, but he could not help it; there was the system in operation, and there were the results.

Already, and it must be said against the innermost wishes of the experimenters, a great Stock Exchange sensation had been created in London with a consequent depreciation of the value of the shares of gas companies, when experiments had been carried on at the West and East India Docks; and although in France such novelties do not impress so much the money barometer, yet there was a commotion—an electric shock, in fact—produced in the hearts and pockets of interested parties. The most curious, and it must be said most unfounded attacks were at once directed against the new system. Mr. R. Jablachkoff and his friends, not in the least discouraged by this first success, did not choose to answer, but applied themselves to justify this gas quake; they erected a vast laboratory, provided with every appliance necessary to closely study the capabilities of the new system, to closely cross examine, if it can be so put, all the electro-magnetic apparatus known, so as to find the best, and also to make themselves acquainted with any difficulty that might present itself in practice. Once these necessary preliminaries over, they found themselves prepared to answer any *ex parte* criticism that might be levelled against their new system of lighting by what they call electric candles. The name of electric candles may, perhaps, appear pretentious, but in practice it is completely justified since the apparatus or contrivance is in nearly all particular and aspect similar to an ordinary candle; they succeeded, in fact, to manufacture a new and simple article of commerce as easily saleable as ozokerite or other candles. It would be useless to compare the electric candle to the regulator, especially after having seen both in operation. The candle when employed to give a large focus of light, similar to that produced by a regulator, shows 30 per cent. more of lighting power, *ceteris paribus*. This is easily explained, and will be readily understood when the candle is described.

**CANDLE JABLACHKOFF.**—Mr. Jablachkoff's electric candle consists of two cylindrical pencils of carbon, placed one by the side of the other, but of course separated from each other by means of a non-conducting compound. The lower ends of the carbons penetrate into a pair of brass pipes, doing office of candle stick, and the whole, when wanted, can be easily screwed on a chandelier *ad hoc*. A piece of asbestos paper dipped into an agglomerating compound, and turned round the lower end of the candle, prevents the carbons from separating, and when a current is made to ascend the voltaic arc is formed at the top ends of the pencils of carbon, which are slowly consumed. The non-conducting compound placed between the two pencils is heated, melts, and renders the candle more conducting. Moreover, the china-clay, which is non-conducting when solid and cold, becomes conducting when melting. That greater conducting power of the voltaic arc and of the china-clay when melting permits of

several focuses being placed on the same circuit, a result never attained with regulators. With a regulator the caloric given out is entirely lost, whereas it is utilised in the candle to raise to a greater heat the non-conducting and refractory substance placed between the carbons, hence the additional brilliancy of the light, and the consequent increase of lighting power. Another very important point resulting from the employ of electric candles deserves attention, as it brings the employ of electric light very near that of ordinary gas. The regulators require each a special current. On the other hand, it is possible with the candle, as it has been said to place several lights on the same circuit, and the greater the force the greater the number of focuses obtainable. It results from this invention that several rooms in the same building can be lit with a single machine, and that independently of each other. If there is only one room to light up the candles can be so distributed that no shadows will be possible; this can be effected either by disposing the focus round the room, or by grouping on a chandelier in the middle, exactly as in the case of gas. It is due to this improvement that electricity as a source of light can replace gas almost everywhere.

Greenwich, Dec. 26.

A. VASSARD.

## THE NICKEL TRADE.

SIR.—In the Journal of Dec. 15 a correspondent who writes under the initials "J. H. C." speaking of the nickel trade, states that "both Williamson, of the Goldenhill Nickel Works in Staffordshire, and Barker, of Birmingham, seem to have ceased to deal in nickel ores, I now never see their names mentioned"; such, however, is not my case, as any of your readers will find from a perusal of my advertisement, which appears monthly in your paper.

Stoke-upon-Trent, Dec. 27.

J. W. WILLIAMSON.

## THE NICKEL TRADE.

SIR.—In the Journal of Dec. 15 there appeared a letter from "Capitalists," very fairly commenting on the secret way in which the nickel trade is carried on. But whose fault is it that the trade is left in the hands of the one or two large firms who at the present time virtually monopolise the trade and rule the markets? There certainly cannot be any blame attachable to them for taking advantage of the apparent unwillingness of others to embark in the business. The fault lies with the general public, who have not sufficient enterprise to enter the lists with powerful, well established, and wealthy opponents, who, doubtless, would exert themselves to the utmost to defeat any others encroaching on their monopoly. With the recent large discoveries of ore in New Caledonia and elsewhere, why does not some one start works for the commercial manufacture of nickel on a large scale? If "Capitalists" are prepared to assist in taking active steps for either manufacturing nickel themselves, or forming an association of miners to erect and carry on works I shall be glad to hear from them direct, and can give them most valuable information and assistance.

SMELT.

City, Dec. 28.

## NICKEL ORE.

SIR.—I fear some mistake has crept into the quotation for nickel ore in the Journal of Dec. 14. I have had an experience in selling this article extending over some years, and I know to a certainty that when nickel was selling for more than double its present price the refiners would not pay for ore of 10 per cent. so much as 40/- to 45/- per ton, so it is not likely they will pay those prices with nickel at less than half the then value. In my experience I have never known the refiners pay more than about half the value of the contained nickel in an ore of 10 per cent., so I think 25/- per ton would be as much, or more, than could now be obtained for an ore of that percentage. If I am wrong, perhaps some correspondent will inform me, through the medium of the Journal, where a better price than this could now be obtained.

A.

## NICKEL AND NICKEL ORES.

SIR.—I am glad to see that you have at last commenced to quote nickel and nickel ores in your Price Current, as I do not doubt that the result of creating an open market for the metal will be to extend its use, and confer a lasting benefit on miners and smelters. The suggestion made by a correspondent that the smelting and refining of nickel ores would be a lucrative business is worth consideration; but arrangements would have to be made to deal with 2½ to 3 per cent. ore rather than 10 per cent., if Cornishmen and Devonians are to be benefited, and what is more they must find an economic method of separating the nickel advantageously from other metals contained in the same ore.

I believe there are some very valuable nickel deposits belonging to the Duke of Argyll on one of his estates in Scotland, but he is about the only man in this country who could raise a 10 per cent. nickel ore. About 6 per cent. is the highest I have heard of down this way, and that was mixed with several other metals.

Dec. 24.

TRURO.

## THE TRIALS OF ROCK DRILLS.

SIR.—We must again trespass upon your kindness, as Mr. Attwood, the secretary to the Dunn Drill Company, has thought fit to impugn our statements, and try otherwise to discredit us. Possibly he may consider that he did not make an attack upon us, by quoting that the Dunn was preferred to the Ingersoll, and that it had beaten the English and other drills at Quenast. As he says in his final paragraph, they do not wish to seek notoriety by lauding their own machine and depreciating all others. Mr. Attwood would appear to admit that the Ingersoll can drill faster than the Dunn by his remark that the best drill is not that which for a few minutes will bore at the highest speed, yet further on he puts the Dunn as having accomplished 21 centimetres per minute, and the Ingersoll only 10 centimetres in the same time. This seems rather contradictory. Mr. Attwood's letter does not refute what we said of the trial of the Dunn at Messrs. Clayton's, and we see that your correspondent, Mr. Waddington, more than confirms what we wrote you of the trial. Mr. Attwood copies part of what we have said respecting show trials. We differ from his conclusion that show trials afford an opportunity of judging of the principle of the machine unless one is laid out on the bench, and opened to show its internal working parts. We maintain that if a drill will not work well under such favourable conditions as a show trial but little good can be expected from it in the ordinary complicated conditions under which in practical working in mines it will be subjected to. We had good reasons for asking the question we did about the preference given at Bardon Hill to the Dunn drill, as there are two of ours there and only one Dunn, and being at a loss to understand the said preference we asked the question ironically. We note that Mr. Attwood only denies that the Dunn gave cheaper and better results.

As regards the trials in Belgium, we referred to the same as Mr. Attwood, and since August we have sent, as stated, seven drills to those quarries, making nine Ingersolls now at work in the quarries of the Société Anonyme de Porphyre de Quenast. The result of the trial was not as Mr. Attwood put it; his drill only did 19½ feet, whereas the Ingersoll did 21½ feet per day, these being the averages of a month's work, and showing 10½ per cent. in favour of the Ingersoll, but had the amount of compressed air consumed been taken into consideration, the Ingersoll would have shown a much larger percentage over the Dunn. Our advertisement, like that of the Dunn, appears in its proper place in the Journal. We do not advertise ours as the cheapest, simplest, strongest, and most effective drill in the world, but simply quote the remarks of the judges at the American Institute, New York, when awarding our drill a silver medal. We make it a practice never to laud our machines, but a ways quote facts for which we have vouchers, finding these sufficient at all times without any additions from ourselves, and from the number of first medals and highest awards obtained by our drills, we consider we may be justly proud of the merits of the Ingersoll, and we are prepared to run it on trial against any other drill for one, two, or three months. We are only too anxious to put our drill in competition to the full test of actual practical work with any other machine, and we are willing to join with any other maker or makers in an arrangement for the most exhaustive trial that may be suggested, making only one stipulation—that the cost of plant,

maintenance, and labour, and weekly or monthly progress, be reported in your Journal in a tabulated form.

London, Dec. 27.

LE GROS, MAYNE, LEAVER, AND CO.

worth of 30,000/- a double the dressing sary, to be paid 1-1/2 years, and known, to work one Cardigan mense, and far as it would return Goginan.

E. S. G.

## THE GREAT DISCOVERY OF LEAD NEAR RHAYADER, AND OTHER MATTERS.

SIR.—Being a native of Rhayader, and at present residing within a short distance, and connected with some of the mines near there, I was greatly surprised to see the name of Mr. Saccombe, of Tavistock, Cornwall, mixed up with the recent great discovery that I know has been made by an old and skillful miner from Flintshire. From what I know of the respected lord of the manor of Builth, who would never stoop to wrong a poor miner out of his discovery, I am at present quite unable to fathom by what legitimate means one and all of your correspondents ignore the discoverer and attach to it the name of a gentleman who I believe knows nothing at all about it. It is only fair to Conway and your numerous readers to understand that the mine is put into the hands of the most influential mine manager at present in Wales, and who, I have no doubt, will at an opportune moment bring it out as it should be done, and I hope with the same results that have attended his efforts and foresight in other places, and so make the old district of Nant-y-car, now deserted for many years, to resound with the clatter of the miner's pick and gad, and with the new year bring prosperity to one and all, not forgetting Conway.

Dec. 20.

E. S. G.

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SIR.—Seeing some letters on this subject which have appeared in your valuable Journal for some weeks past, I would beg to call your attention to the Cwm Rhayader Quarry, about three miles south from the Dynin Quarry, now at work. The Cwm Rhayader Quarry has been opened out by Mr. Richard Evans, of Dolwen, near Goginan, at an expense of between 50/- and 60/-, and states of excellent quality raised therefrom, and from the report of Mr. Hughes, the manager of the Aberllefenni slate Quarry, the property can be made to pay good profits as soon as the machinery is erected, for which there is every facility, and judging from Mr. Hughes' report I am inclined to believe if there is a really good slate quarry in this county that Cwm Rhayader, if worked by a party raising the requisite capital, will be found to be the best in it, although I have nothing definite to say of the others.

ABSAJOM FRANCIS.

Goginan, Dec. 27.

## SLATE QUARRIES IN CARDIGANSHIRE.

SIR.—Seeing some letters on this subject which have appeared in your valuable Journal for some weeks past, I would beg to call your attention to the Cwm Rhayader Quarry, about three miles south from the Dynin Quarry, now at work. The Cwm Rhayader Quarry has been opened out by Mr. Richard Evans, of Dolwen, near Goginan, at an expense of between 50/- and 60/-, and states of excellent quality raised therefrom, and from the report of Mr. Hughes, the manager of the Aberllefenni slate Quarry, the property can be made to pay good profits as soon as the machinery is erected, for which there is every facility, and judging from Mr. Hughes' report I am inclined to believe if there is a really good slate quarry in this county that Cwm Rhayader, if worked by a party raising the requisite capital, will be found to be the best in it, although I have nothing definite to say of the others.

ABSAJOM FRANCIS.

Goginan, Dec. 27.

## CARDIGANSHIRE MINES—CWM ERFIN, &amp;c.

SIR.—I am much pleased in being able to inform you that the end of the year 1877 leaves us in a much better position than the beginning of the year found us in. I shall not presume to give you particulars at present respecting all of the mines, but I may probably be called on to do so officially on some of them at no distant date. Amongst the great and rich discoveries in new mines that have been started this year are, 1st—The Cambrian Mines, where the discovery of an immense body of copper ore at Egair-Firath cannot fail to make this county almost as famous for its copper as for its lead and silver-lead mines. A very important discovery has been made, also, at the Tyn-y-Fron by the opening of a new hole, running parallel to the old hole, and only about 3 fms. from it, very rich in blonde, lead, and copper ores. This hole has been proved for 60 fms. long, and the ends going east and west are both very rich, and opening out profitable ground.

The Caron Mine has been started with ample capital, and good results are anticipated from it. The Red Rock and the South Cwmystwyth have made progress, and have been brought into a good state of return. A good course of ore has been found at Egair Mwyn. The Cwm Brwyno Mine has been re-started and the company are now raising ore in the 92 fm. level at 4/- 10s. per ton delivered into the bin. The shaft has been sunk to the 104, but no level has been driven west under the ore ground referred to.

Blaen Dyffryn Mine has also changed owners and good ore found in driving east. At the Bwlch Consols, through which passes the Old Goginan hole, and which has not been sunk as deep in this set as the Goginan deep adit by 30 fms., where the rich discovery of ore was first made. Capital has been raised to carry on further workings, and there can be no doubt it will result in a very great success; whilst at many of the older and long-established mines discoveries of great and lasting importance have been made. But it now remains for me to call particular attention to the

Cwm Erfin Mine,

It stands to the north, and is bounded by the Goginan Mine, which has yielded upwards of one million pounds sterling of ore; also to the south of East Darren, its northern boundary joining it, which has produced nearer two millions than

DEC. 29 1877.]

## SUPPLEMENT TO THE MINING JOURNAL.

1441

worth of lead ore, rich in silver, and left them profits of between 30,000*l.* and 40,000*l.*, and if properly managed would have made double the amount. It has machinery on it, and in good condition, consisting of water-wheels for crusing, pumping, drawing, and dressing; every convenience in the shape of buildings that is necessary, together with pitwork, and everything that is required for years to come, and which taken together did not cost less than 800*l.* These can all be had for the value of the machinery; and a new lease for 21 years, at 1-15th royalty, will be granted to any respectable party who would work the mine. The last company paid 1-12th royalty. A working capital of 2000*l.*, in addition to purchase, would make this a richer and a better mine than it ever was, and I cannot think, nor do I believe, after these facts are made known, but that someone will be found to do what is required to work one of the very best properties now remaining unwrought in Cardiganshire, and where 5000*l.* laid out judiciously at the commencement of the year 1878 would, at its close, have laid open, as far as it is possible for human foresight to predict, a property that would pay 10 per cent. per annum on 100,000*l.* The old hauls and slimes, and ore on stalls on the mine, I value at 10,000*l.*, which can be returned at one half profit.

ABSAJOM FRANCIS.

Gwynnion, Dec. 24.

## GREAT WEST VAN MINING COMPANY.

SIR.—I have read with much interest the letters relating to this mine which have appeared in the last two numbers of the Journal, and can almost fully endorse the sentiments expressed. My fear is that the directors have been allowed to go on as they liked too long. The steps which "Original Shareholder" proposes was put forward by me at the meeting of the shareholders held on Nov. 12, but it did not meet with the support of the majority of that thinly attended meeting, most of whom were the directors' friends. As a large original shareholder and having subscribed 2000*l.*, I shall be happy to assist in any movement for getting a searching investigation made into this company's affairs from its commencement, and, if necessary, in making the directors responsible for their acts, including the payment of dividends out of capital.

W. WARD.

Old Broad-street, Dec. 28.

## THE WHITE CLIFF LEAD MINING COMPANY, LLANRWST

SIR.—I shall be glad to know through the medium of the Journal how this promising concern is now going on, and how it is that there are never any reports from the captain in the Journal, as is so necessary to keep the outside shareholders well informed and the public alive to the existence of the company? It is known that first-class machinery for crushing and dressing, supplied by Mr. G Green, of Aberystwyth, has lately been completed, and some of the directors recently visited the mine to see the machinery started. Now, as there was on surface many months since a large pile of lead stuff waiting to be dressed, and as the lodes are worked upon in both sets (Aelwen and Corlanchog) are very strong and productive, it seems probable that some immediate and tangible result may be looked for now the machinery is working. This mine is in the same district as the D'Eresby Mountain, about which so much has lately been written, and having only a small paid-up capital, should soon take a prominent place in the market, there having already been several lots of ore sold.

Having known much about this property up to last summer, and having most implicit confidence in it, I should be obliged by the directors making known through your columns what position affairs are now in. Though not officially connected with the company I am satisfied the shareholders may rest content that their interests are being most carefully guarded by the directors, who devote considerable time and attention to the energetic and economical working of their property. Moreover, one of their number deserves the warmest thanks of his fellow-shareholders for having undertaken gratuitously the onerous duties of managing director at considerable personal inconvenience to himself. Regular reports from the mine (and sent by the captain himself) should be made public.

Gresham-street, Dec. 27.

HOWARD C. PARKES.

## OLD TREBURGETT MINE.

SIR.—The malevolent spirit which characterises throughout the letters (especially the last) of "The Miners of Old Treburgett"—who have proved themselves to be really only a few designing persons—compels me to decline to continue the correspondence with them; and I shall, therefore, treat any further letters from them as unworthy of notice. But before closing this discussion—at least so far as I am concerned—I would remind them that abuse is not argument, although they imagine low personalities to be such. The character of the person against whom their mean in inuitions are aimed stands too high in the mining community to be in the least affected by their vile aspersions. What is the gist of the main controversy? A few discontented miners (who are deservedly tabooed by their late fellow-workmen), under the assumed title of "The Miners of Old Treburgett," have sufficient conceit to state that they are prepared to work the mine on their own account. I have shown most conclusively that this cannot be done without fresh capital, for if the "miners" could do so, surely the lords could do likewise. This does not look like "the ground slipping from under his feet," although "slippery" characters may "dream" that it does. The lord is quite right in treating their ridiculous offer as absurd and unworthy of notice. Then, again, I asked what guarantees they could give, to which they replied that they could provide a surety for the long period of one month! Comment is superfluous. "Miners" write: "If an Old Shareholder wishes it, we shall be most happy to insert our names in full." I doubt their being "happy" in doing so, but I will at once say, for obvious reasons, that I do "wish" it; but, unless I am very much surprised, your readers will see that that serpent-like, they will wriggle out of it. Perhaps they will also append the name of the "surety," who, I should not be surprised to find, is "a man of straw," and well known for his Bacchanalian propensities.

## AN OLD SHAREHOLDER.

## VALE OF CONWAY LEAD MINES.

SIR.—It is cheering for all connected with mining, besides "An Examiner of Mines," to find a piece of mineral-bearing ground previously thoroughly inspected turning out according to one's expectations. "Nunquam non Paratus" is evidently labouring under the idea that no one but himself said of and reported on the Vale of Conway as being a mine of great promise; however, I would refer him to the reports of George Henwood, C. F. Collan, C. E. Captain Jeffreys, and several others upon the mine. Surely this most valuable piece of ground need no letters of recommendation or certificate of charter from "Nunquam non Paratus," and, indeed, from no one else. The mine in itself is its best friend and reporter, and conclusively demonstrates beyond a shadow of a doubt to every practical person that there is a future in store for it, and that the good times are not far off. The mine was evidently well proved before the present company came into possession, and the ground laid bare and opened up by them was the cause which induced the directors to take it up. The directors in the meantime, I presume, have found nothing to alter their first decision; on the contrary, I am informed that the directors have still the best opinion of the mine, and feel confident that before many months of 1878 have passed they will be able to declare their first dividend. I am also informed that at the first general meeting of the company, held some two months ago on the mine, the Cheshire man proposed that no director should receive any remuneration beyond his actual expenses until they have declared their first dividend, which their directors readily assented to. This proves, in my opinion, Mr. Editor, that the mine is in safe and honest keeping, and that, consequently, it cannot of necessity fail to come up to the original expectations of the shareholders.

Now Mr. Editor, I dismiss the stray shots of "Nunquam non Paratus" as being unworthy of the further notice of parties who cannot be expected to know what is "right or wrong" in the carrying on the working of a mine, yet full of concert, and pass to the mine itself, which from all appearances, is likely to turn out as great a success eventually as the D'Eresby. The representations of the old people regarding the D'Eresby were by the modern mining world treated with contempt, and always laughed at as simple nonsense, but what has the great discovery at D'Eresby proved? Nothing less than that the keen knowledge of the old people of the formation of minerals was, if not superior, at any rate, not inferior to the foremost of the modern judges. The old people stated there was a masterly lode passing the D'Eresby, and because the old people said so it would not be believed. Now Mr. Editor, this is also the case as regards the Vale of Conway Mine. The old people state that there is also a masterly lode pervading this property, and indications on surface confirm them. They say that the cause of stopping working was the influence of the water, and the then inadequate means of pumping and draining. Saying comes down from father to son, and some of the oldest inhabitants now point out the lodes from which large quantities of ore used to be gotten when they were boys. The lodes which are stated to be so rich in mineral

are the north and south lodes running along from the wheel to the river, and which by a twist near the smithy becomes east and west. I would strongly recommend all interested to bear these in view, as I am sure, as already stated from indications at surface, that the company will here find their *forte*, and that the statements of the old people were correct. I do not, however, by these remarks detract from the lodes at present operated upon. On the contrary, they are lodes of great promise, and which will prove highly remunerative; in fact, will on the capital yield fine dividends. It was gratifying to read the letter of Capt. John Roberts, in which he stated that the sales would be regular in future. What more can any manager state, and what more can any shareholder expect? If the shareholders will allow me to give them any advice it will be this. Consider yourselves fortunate to be so, and stick to your shares. Do not part with them, because if you do you will only repeat of it at your leisure.

A. B. C.

## THE CAMBRIAN MINING COMPANY.

SIR.—About a fortnight since Mr. Tredinnick called at the offices of the Cambrian Mining Company, in an excited state, and endeavoured to borrow money. I ordered him out of the office, and he then threatened to do all he could to damage the company. He has proceeded to put this threat into execution by his statements in last Saturday's *Mining Journal*, which statements and figures are utterly false. Perhaps no one acquainted with him would have expected otherwise; but when you, Sir, print his statements you invest them with importance, and I, therefore, must request that you give this explanation and denial as great publicity as you have the falsehoods which call it forth.

GEORGE H. KEENE, Managing Director of the Cambrian

Dec. 27. Mining Company (Limited).

## "CIRCULAR MINING."

SIR.—The letter of Mr. Sharp in the *Journal* of last week is one that is commendable as exposing the dishonest means many firms issuing circulars are prone to and adroitly pursuing. Unfortunately, I am one of those who invested in one of the mines at 25*s.*, through the medium of my receiving such circulars as Mr. Sharp refers to; and it was through such agencies, I may also state, that I invested in Tholomine and Thornhill Reef, and a great many other such mines as have caused me serious losses, and, so far, no legal means of redress. I would respectfully ask those persons who have invested in mines through the medium of circulars whether they have sought a cure against the annoyance of receiving by every post the circulars issued in their so called clients' interest? The worst feature is that this plan of recommendation goes on for a time, and one sees favourable reports accordingly, and then all ceases, and on making enquiry it is found that the shares are worthless; a liquidator is appointed; and whether anything is realised or not out of the property it is hint'd (on application) that the expenses are barely met. Surely, Sir, the law can provide some remedy.

A VICTIM.

George H. Keene, Managing Director of the Cambrian Mining Company (Limited).

## [ADVERTISEMENT.]

## WEST CRAVEN MOOR MINE.

SIR.—H. Gould Sharp and Co., of 42, Poultry, London, E.C., having libelled us in a most malicious and unjustifiable manner, seek doubles, by means of "Advertisements" and "Cautions to Shareholders" to elicit from us some personal or other remarks which would probably be used to endeavour to prejudice the proceedings we have taken against them.

While masters are *ad judicis* we do not intend to allow ourselves to be drawn into recriminations by any such strategy. We are pleased to know that it is their intention to fight us to the "bitter end," as that is what we are most anxious to ascertain. When the "bitter end" arrives shareholders in West Craven Moor and a host of other equally valuable concerns will have an opportunity of judging between us.

We repeat that West Craven Moors were offering in the market, and dealt in by us at 7*s.* Interested parties, finding us offering them at that price, came in and bid the price up to 8*s.*, which for the mom-nt is their *real* quotation.

It is unfortunate for Llanwrst shareholders that they have been frightened out of their shares before ascertaining from some reliable channel "who Messrs. Gould and Co. were."

GREGORY, WHITAKER, AND CO., Stock and Sharedealers,

81, Bishopsgate-street, London, E.C., Dec. 27.

Established 1871.

[For remainder of Original Correspondence, see to-day's Journal.]

## Registration of New Companies.

The following joint-stock companies have been duly registered:

GREENBANK ALKALI WORKS COMPANY (Limited).—Capital 120,000*l.*, in 10*s.* shares. To acquire the Greenbank Alkali Works and the Greenbank Collieries. The subscribers (who take one share each) are—W. J. Menzies, Shelton Hall, Malpas, Cheshire, manufacturer; S. J. Menzies, Ecclesall Hill, St. Helen's, manufacturer; W. H. Innes, Lymanore Hall, near Wrexham, shipowner; C. M. Holland, C. E. Chester; J. W. Cropper, Dingley Bank, Liverpool, gentleman; H. Rucker, West Hill, Wansworth sugar broker; E. Johnson, Rainhill; W. Marsh, Ullswater, analytical chemist. The directors are—Messrs. W. H. Jones, W. Cropper, C. M. Holland, W. J. Menzies, S. J. Menzies.

ACASTER PATENT RAIL JOINT COMPANY (Limited).—Capital 50,000*l.*, in 1*s.* shares. To work a patent for improvements in joints for rails. The subscribers are—J. A. Acaster, Princess Works, Sheffield; D. T. Furness, Whelon House, Sheffield; C. H. Wilson, Crabtree, Sheffield; E. Hall, Abbeyleix Park, Sheffield; 10; E. Hodson, Sheffield; W. Lover, Sheffield; 5; B. Wake, Abbeyleix, Sheffield; 10.

ROTHERHAM AND DISTRICT TRAMWAY COMPANY (Limited).—Capital 50,000*l.*, in 1*s.* shares. To construct and maintain tramways in the West Riding of Yorkshire. The subscribers (who take ten shares each) are—H. Holmes, Port-land-road, Horsecy; J. F. Merton, 20, Spring Gardens, S.W.; A. Davison, Bishop-stortford; F. J. Heseltine, Connaught-square; W. E. Leyton, 1, East India Avenue; J. W. Newton, 5, Furnival's Inn, W.C.; A. C. Riddick, Effra road, Brixton.

TENBY LAND AND INVESTMENT CORPORATION (Limited).—Capital 50,000*l.*, in 1*s.* shares. To carry on business as a land company in Tenby. The subscribers are—C. H. Smith, Tenby; 1; J. Gwynne, Tenby; 1; J. Taylor, Caldy Bland, Pembroke, 10; C. W. R. Stokes, Tenby; 10; W. H. Richards, J. P. Tenby; T. P. T. Langmead, Tanfield-court, Temple, E.C.; H. T. Smyth, Tenby, 1.

ENGLISH AND SCOTTISH LAND AND BUILDING CORPORATION (Limited).—Capital 250,000*l.*, in 5*s.* shares. To carry on the general business of a land and building company. The subscribers (who take one share each) are—T. A. Massey, North Cheam; H. Clifford, 35, Mall-road, Hammersmith; V. Holt, 2, Springfield Villas, Tottenham; J. Kelly, 125, Alton-road, N.; G. S. Ulathorne, 12, Bellingrove grove, Wandsworth Common; E. T. Tremayne, Great George street, S.W.; E. W. Robertson, 7, Travvers-road, N.

PLYMOUTH PIER COMPANY (Limited).—Capital 40,000*l.*, in 5*s.* shares. To construct a pier at Plymouth, Devon. The subscribers (who take one share each) are—J. McMillar, Paper Buildings, Temple; John Flockering, 21, New Bridge-street; E. Birch, Lowestown Lodge, Hampstead; W. Berrell, 57, Fentimont-road, Brixton; E. Everett, 13, Mayland-road, Shepherd's Bush; J. R. Simpson, 7, Sydney terrace, Clapham; H. Ayton, Artillery-road, Brixton.

GLYN CEIRIOG WOOD BLASTING POWDER COMPANY (Limited).—Capital 20,000*l.*, in 1*s.* shares. To take over the business of the Patent Gunpowder Company (Limited). The subscribers (who take one share each) are—W. B. Metcalfe, Lower Thamestry-street; C. F. Clements, 20, Birchin-lane; H. Noel, Westbourne terrace, Hyde Park; N. D'Oyley, Charles-street, Berkeley-square; T. A. Butler, St. George's Villa, Walthamstow; T. W. Lee, 10, Arlington-square; T. Allison, 23, Old Broad-street; J. Taylor, Wool Exchange.

WOKINGHAM DISTRICT WATER COMPANY (Limited).—Capital 20,000*l.*, in 1*s.* shares.

LONDON RE-INSURANCE (Limited).—Capital 200,000*l.*, in 5*s.* shares. To undertake the re-insurance of life policies, and every description of insurance except life and accident. The subscribers (who take five shares each) are—H. Nathall, 33, Woodcote place, Lower Norwood; R. S. Pearce, 34, Tulse Hill; E. D. Rogers, Church End, Finchley; C. W. Pearce, 7, Acme-lane; W. S. Williams, Beech Vue House, Honor Oak Rise; E. W. Allen, 11, Ave Maria-lane; W. C. Crampton, 4, Cottage-road, Westbourne-square.

LANCASHIRE AND YORKSHIRE ACCIDENT INSURANCE COMPANY (Limited).—Capital 20,000*l.*, in 5*s.* shares. To carry on the general business of an accident insurance, and guarantee company. The subscribers are—Richard Haworth, High-street, Manchester, 100; J. B. Northcott, 28, King-street, Manchester, 1,000; H. Morgan, Lee Hall, Prestbury, 100; F. P. Sharp, St. Anne's square, Manchester, 50; T. M. Macdonald, Victoria-street, Manchester, 5; James Croston, Cross-street, Manchester, 50; P. Gibbons, Swanwick, Cross-street, Manchester, 100.

THENTON COTTON SPINNING AND MANUFACTURING COMPANY, NUNEATON (Limited).—Capital 30,000*l.*, in 1*s.* shares. To acquire the Nuneaton Cotton Mills, at Nuneaton, Warwick. The subscribers (who take one share each) are—J. S. Brown, Catecote-street, Manchester; W. Brown, Little Bolton, St. Helens; H. Dean, Saltford; T. Ormerod, Bury; J. Turner, Preston; G. Ormerod, Bury; T. Limbrick, Bury.

MOORFIELD HOTEL GARDENS AND PROPERTY COMPANY (Limited).—Capital 20,000*l.*, in 5*s.* shares. To acquire the Moorfield Gardens at Sale, Cheshire. The subscribers (who take one share each) are—John Whitty, 2, Duke-street, Manchester; W. Cannell, Cheetham, Oriole Close, Liverpool; S. Ashton, Rosedale-road, Manchester; J. H. Thompson, Manchester; J. F. Cooke, Sale; C. D. Wells, Hulme; R. T. Thompson, Manchester.

NORTHFLEET BRICK COMPANY (Y) (Limited).—Capital 10,000*l.*, in 1*s.* shares. To work for clay and brick-earth, and to carry on the manufacture of bricks, &c., at Northfleet, Kent. The subscribers (who take one share each) are—C. R. Miles, 79, Coleman-street; G. Blackmore, 74, Wharf road, City-road; H. Notingham, 79, Coleman-street; J. Blackmore, 75, Marl-lane; T. G. Brinkell, Bouverie street, Stoke Newington; W. F. Daniels, 77, Tavistock-crescent, W.; J. Wykes, 21, Meon lane.

VICTORIA REAL PROPERTY COMPANY (Limited).—Capital 30,000*l.*, in 2*s.* shares. This appears to be Lancashire Land Company. The subscribers (who take five shares each) are—A. H. Allen, High-street, Pendleton; W. T. Dutton, Flixton; E. Williams, Westgate; E. Waters, Pendleton; J. Lowe, Stretford; J. Waters, Pendleton; R. B. Craig, Skipton.

LONDON AND COUNTY SANITARY STEAM LAUNDRY COMPANY (Limited).—Capital 150,000*l.*, in 10, 6*s.* and 100,000*l.* shares. To carry on the business of a laundry company. The first seven subscribers are—J. A. Humphrey, 78, Haverstock Hill, 20; W. B. Ffolkes, 48, Davies street, W., 500; W. H. V. Sankey, 42, Leicester-square; G. Cook, St. Anne's Hill, Wandsworth, 20; F. A. Foster, Silvri Dale, Sydenham, 20; C. Buckhurst, 166, St. Paul's road, Camden Town, 20; W. H. Todd, 29, High-street, Hampstead, 20.

READING TRAMWAYS COMPANY (Limited).—Capital 50,000*l.*, in 1*s.* shares. To construct and maintain tramways at Reading. The subscribers (who take 10 shares each) are—A. H. Sanderson, 18, Clement's Inn, Strand; Sir Wilford Brett, Bisham, Leicestershire; Clement Stretton, Leicester; George White, Corn-street, Bristol; J. F. Merton, 20, Spring Gardens, S.W.; H. Hughes, Tintern House, Leicester.

WESTCOME PARK ESTATE (Limited).—Capital 100,000*l.*, in 1*s.* shares. To acquire the Westcombe Park and Woodlands Estate, near Greenwich. The

subscribers are—H. Ambutt Newbold, Beccles, Leamington, 150; H. Poulton, the Poplars, near Mitcham, 150; N. Hunter, Abingdon street, S.W., 150; L. H. Isaacs, Verulam-buildings, W.C., 150; J. Yardley, Lime-grove, Lewisham, 150; J. Edmiston, 12, Great Winchester-street, 150; E. Rawlings, Barnes, 1.

STAR ROLLING MILLS COMPANY (Limited).—Capital 10,000*l.*, in 5*s.* shares. To acquire and carry on the Star Rolling Mills, Middlesborough. The subscribers are—T. Teasdale, Middlesborough, 40; S. A. Sadler, Middlesborough, 30; R. D. Smith, Middlesborough, 30; R. Hill, Middlesborough, 30; W. Blaikston, Darlington, 30; T. Bargate, Middlesborough, 30; G. P. Bargate, Stockton, 20.

## THE SCOTCH MINING SHARE MARKET—WEEKLY REPORT AND LIST OF PRICES.

During the past week the business done has been small, owing to the holidays, and the alterations in prices are fewer than usual. Investors would do well to take advantage of the present quiet times, as with the turn of the year business usually returns. The indications are almost entirely in favour of an improvement in trade, as the disturbing influences that have caused the unprecedented long depression are one by one coming to an end or being overcome. The first account of next year (settling day, Jan. 16) commenced to-day (

# BEACON STREET TUNNEL,

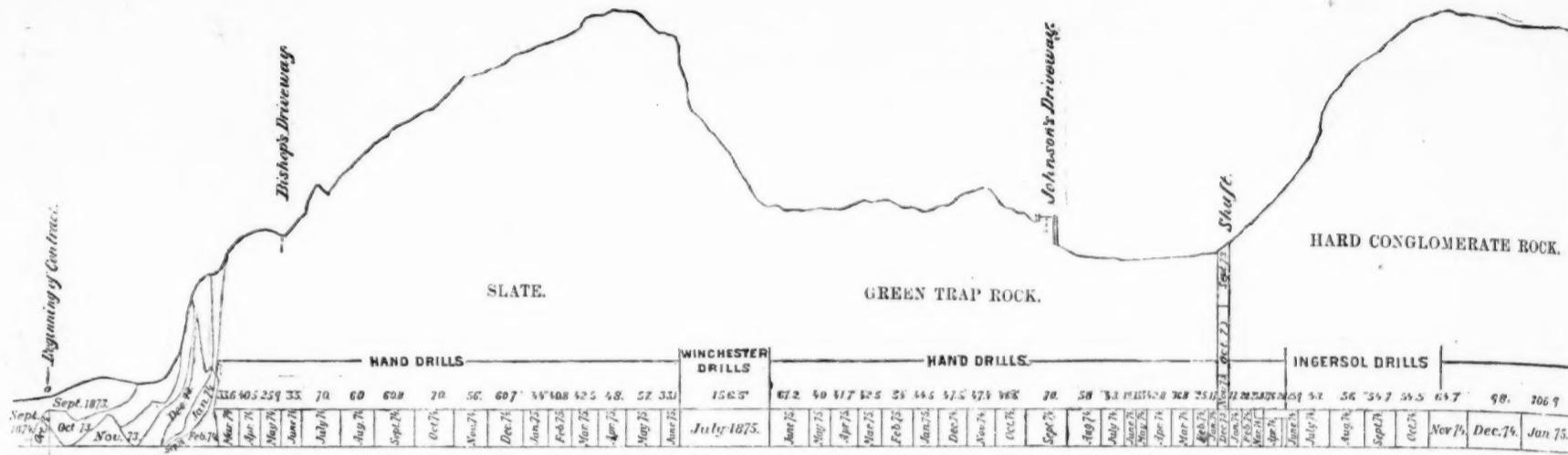
## BOSTON WATER WORKS

### NEWTON MASS.

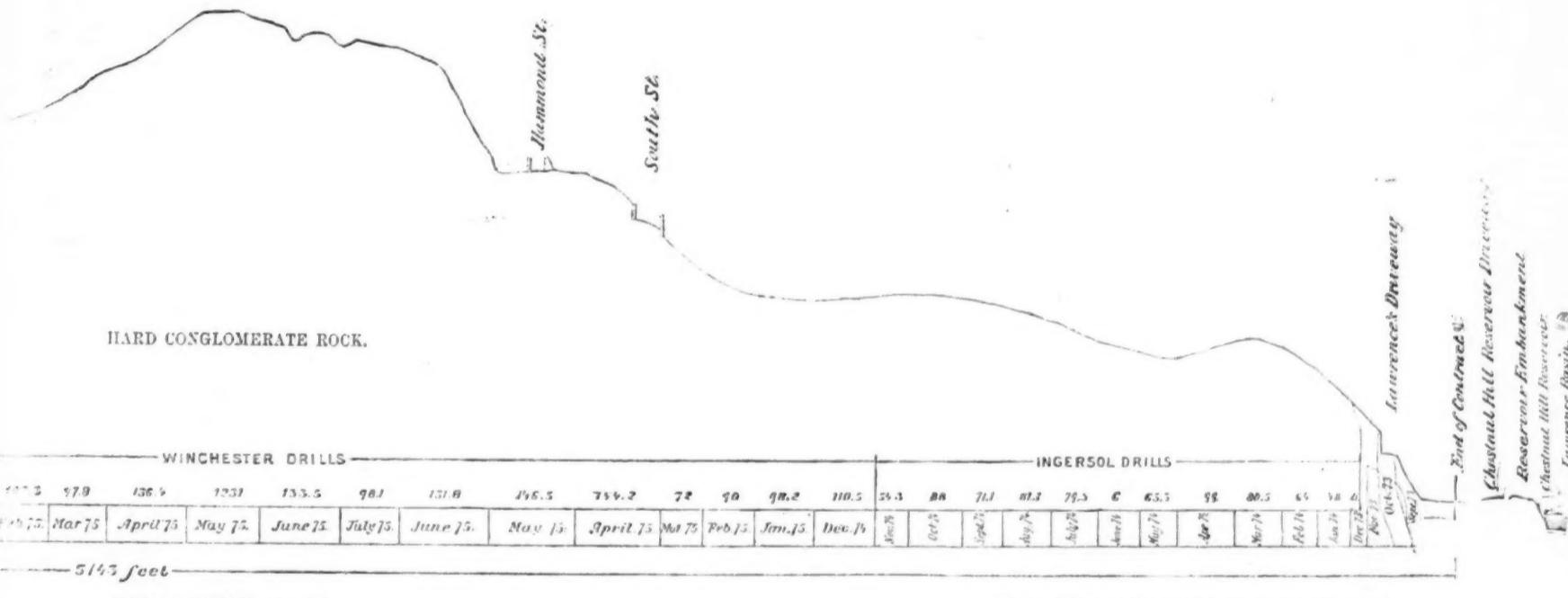
Robert R. Bishop.

Francis M. Johnson.

Newton



C. Perrins | David Austin | Alex. Donaldson | Wm. R. Fisher | Chas. Francis | Amos A. Lawrence | City of Boston.



HARD CONGLOMERATE ROCK.

SIZE OF TUNNEL 10 x 12.

TWO DRILLS ONLY USED IN EACH HEADING.

#### IMPROVED ROCK-DRILLING MACHINERY. THE GLOBE ROCK-DRILL.

The recent comparative trials in Cornwall have proved beyond question that even in ordinary mining operations the use of rock-drills secure increased economy both in time and money, so that it may fairly be anticipated that henceforth the machine drill will be regarded as an essential portion of the plant in all well-conducted mines, in the same way that Blake's Stone-Breaker and some other modern inventions unknown to the miners of the last century are at the present time. Indeed, it is only by the use of the many labour-saving contrivances which inventive ingenuity has brought forward that the vast competition now existing can be successfully met. Happily the erroneous notion which working miners formerly entertained, that the use of machinery was prejudicial to their interests, is no longer entertained, it being now fully recognised that the effect of employing machinery is to increase the amount of labour by rendering it possible to manipulate a far larger quantity of material. In the case of mines, the use of machine drills makes room for the setting of 20 bargains in the time that would otherwise be required for driving a few fathoms, and although employment is thus given to 20 pares of men instead of 2 or 3 pares, and the same or higher wages are paid, the adventurers secure increased profits because the management charges bear a smaller proportion to the work done.

There being no doubt, then, as to the desirability of using machine drills, the only remaining question is as to the best drill to adopt; and to judge from the records and certificates of practical work, the Globe rock-drill appears to be decidedly entitled to the preference—as with reference to this invention the Mining Record, of New York, says—"A cheaper and yet more effective power drill is the great want of our mining industry—one cheaper, less cumbersome, less liable to get out of repair, and doing more work than any machine

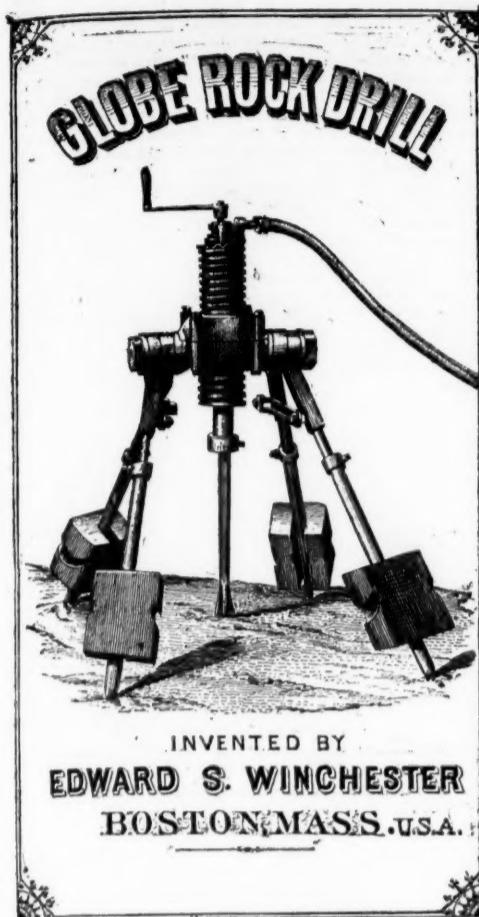
of the kind as yet put into the hands of the miner. This is the one labour-saving mining appliance which must be perfected and cheapened to ensure that economical operation of the greater part of the mines of Nevada, Colorado, and Arizona which is essential to their industrial success—mines which are excluded at present, particularly in their early stages, from using the machine drills of present construction, because of the high first cost, the expense of constant repair, and their size. Few mining adventurers are able in the outset to invest so much capital in drills with the necessary air compressing machinery as is now required. It was found, we are informed, in the work of the Hoosac Tunnel that the Burleigh drill could only be worked 50 hours without having to undergo repairs, and four machines were necessary to ensure having one constantly at work. That, however, was a great improvement upon the Sonnecker machine used in the Mont Cenis Tunnel, of which it was necessary in 1867 to have 200 to keep 16 constantly at work. It is alleged, however, that the Ingersoll machine requires much less frequent repairs than the Burleigh did in the Hoosac Tunnel work, and our opinion is that in the Union rock-drill our American machines made another important advance, but still left desirable, assuredly, the contrivance of a lighter, cheaper instrument, without any failing off at least in the amount of work achieved in 24 hours, as well as securing less cost for repairs. The new Globe rock-drill, manufactured by the Globe Rock-Drill and Motor Company, of Boston, offers admirable features. This small machine—22 in. in length by 4 in. diameter of cylinder—although so light in weight, will pierce hard flint rock with greater rapidity than the large tunnel drills now in use. The piston carrying the drill moves with great rapidity, and delivers 1000 blows at least per minute; with cheapness and simplicity it unites great strength and endurance; these are features which give it special advantages in running levels, drifts, and tunnels. The mechanism by which motion is produced upon the piston of this drill is novel, and embodies principles which are especially

adapted for steam fire-engines, steam-pumps, steam-hammers, ore stamps, and all direct-acting engines."

A glance at the accompanying map, which represents the Beacon Street Tunnel of the Boston Waterworks, Newton, Massachusetts, and which is drawn to a scale of 250 ft. to the inch horizontal, and about 40 ft. to the inch vertical, will show the vastly greater progress made with the Globe Company's drills (there marked Winchester drills) than with any of the others which were used in the tunnel, whilst with regard to its convenience in use, the opinion of Mr. J. L. KOCHER, the superintendent of the Newton Centre Tunnel of the Boston Waterworks, is extremely satisfactory. He states that he has had ten years' experience in the rock-drilling business throughout the United States in the capacity of foreman—tunnelling, mining, ledgework, railroad cuts, sewers, &c., and during that period he has used and worked all the rock-drills generally used for such work—the Gardiner and the Burleigh for three years, the Ingersoll four years, and the Woods and Waring for about one year. He also used the Winchester drill in tunnelling and mining for about one year; he found the Winchester drill superior to all others previously used by him up to the time he saw and worked their new Globe rock-drill upon hard Cape Ann granite rock, and must say that in his judgement their rock-drill greatly exceeds in the drilling of holes, and pierces rock more effectively and with greater rapidity than any other rock-drill he has used in his experience. An important feature is the method of feeding the Globe drill, the cylinder being made its own feed screw, thereby obtaining great strength and durability without increased weight; but the chief feature he observed in working it, and what he considers the most important, is that the drill does not take steam on the forward or striking end until after the blow is fully delivered upon the rock, a point that has never been introduced before in rock-drills that he has seen or even heard of.

[SEE NEXT PAGE.]

# GLOBE ROCK DRILL & MOTOR COMPY., 167, TREMONT STREET, BOSTON, MASS., U.S.A.



WARRANTED SUPERIOR TO EVERY OTHER

## POWER DRILL

IN THE UNITED STATES AND EUROPE,

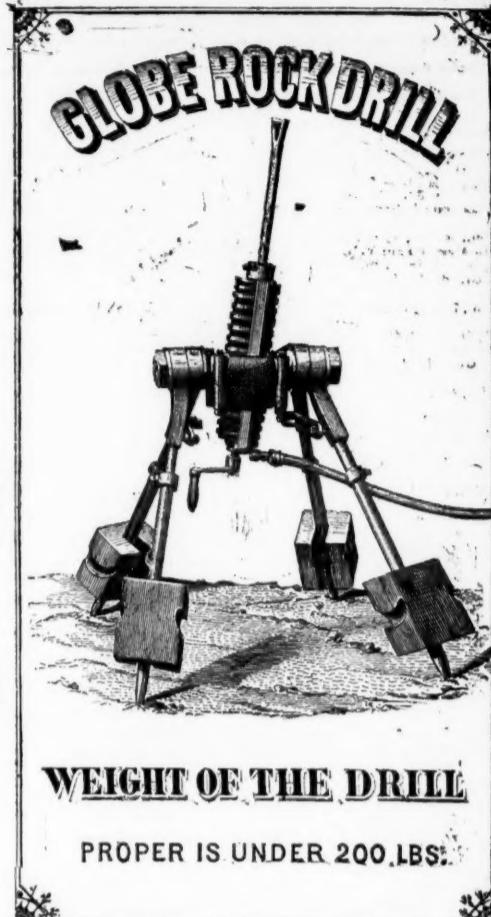
OPERATED BY

### Steam or Compressed Air.

Patented and owned exclusively in the United States, England, France, Belgium, Germany, Russia, Italy, and Canada, by H. K. FLAGLER, and EDWARD S. WINCHESTER, Inventor, Boston, Mass., U.S.A.

The Cost to Manufacture this Drill does not exceed £20.

### TERRITORIAL RIGHTS FOR SALE.



### WEIGHT OF THE DRILL

## To Manufacturers and Dealers in Mining Machinery.

MESSRS.—We respectfully invite your attention to the superior advantages which this New Rock Drill possesses over all others, combining features which have long been desired for mining operations, tunnelling, and quarrying.

FIRST.—It delivers a dead blow, the piston travelling with the greatest rapidity and force at the instant the bit comes in contact with the rock. It is the only drill which delivers such a dead blow.

SECOND.—The valve in this drill is in the piston, and is held to the rear end of the piston by the required pressure of steam or compressed air; the bit coming in contact with the rock arrests the piston in its forward movement; but the valve, being carried with the piston, passes forward by the momentum imparted to it by the piston, thus being changed just after the blow is given, when in all other drills the valve is changed just previous to the blow being delivered. This drill works equally well with steam or compressed air.

THIRD.—The valve in this drill has no tappets, stems, or mechanism of any kind to operate it, therefore none to be destroyed by wear and breakage.

FOURTH.—No automatic feed is required; the valve being changed by the bit coming in contact with the rock, whether the stroke be longer or shorter, gives a better result without an automatic feed than has ever been obtained with one.

FIFTH.—No feed screw is used with this drill, which in all other drills is a source of great annoyance. The drill cylinder has a large thread turned thereon, and is revolved by an eccentric on the rear

head, and passing through a spherical nut or holder is fed forward or backward as required. By this device we have holding strength in excess of requirements, without increased weight. All other drills receive the thrust upon a small feed screw, which is constantly breaking.

SIXTH.—The Globe Drill being held in a spherical nut or holder, in whatever position the drill may be placed, the line of action will come from the centre of holding power. The drill, when running, has no tendency to oscillate, but delivers the blow straight.

SEVENTH.—The cylinder is constructed of wrought iron, one inch in thickness, that it may not be injured by falling rock. The drill proper is but twenty-two inches in length, its weight is less than two hundred pounds. It is made of the best material, capable of great endurance, not liable to breakage; has no bolt, studs, or nuts. Being short, it is especially adapted to narrow cuts, drifts, and will readily commend itself to contractors and miners making good paying mines, and greatly reduce the cost of mining operations and enterprises heretofore looked upon as too expensive to undertake for want of a Rock Drill of this nature and description.

Parties wanting drills will please state the diameter and depth of hole they wish to drill, also the nature of the work to be done.

We offer for Sale the Right to Manufacture and Sell this Drill in the following Countries:—England, France, Belgium, Germany, Russia, Italy, and Canada, for the sum of £1000 each, or we will dispose of the entire Foreign Patents for £5000.

We respectfully solicit CONTRACTS FOR TUNNELS and Approaches to same, where rapid work and quick completion are an object, and we would respectfully call attention to the following letter:

MESSRS. THE GLOBE ROCK DRILL AND MOTOR COMPANY, BOSTON, MASS., U.S.A.

Gentlemen,—In reply to yours of yesterday, asking my opinion of your Globe Rock Drill, I would state that I have had ten years' experience in the rock-drilling business throughout the United States, in the capacity of foreman tunnelling, mining, ledge-work railroad cuts, sewers, &c., and during that period I have used and worked all the rock drills generally used for such work. I used the Gardiner Rock Drill and the Burleigh Rock Drill for three years, and the Ingersoll Rock Drill four years, and the Woods and Waring Rock Drill for about one year. I also used the Winchester Rock Drill in tunnelling and mining for about one year. I found the Winchester Drill superior to all others previously used by me up to the time I saw and worked your new Globe Rock Drill upon hard Cape Ann granite rock, and must say that, in my judgment, your rock drill greatly exceeds the drilling of holes, and pierces rock more effectively and with greater rapidity than any other rock drill I have used in my experience. It combines all the advantages and requisites that workers upon rock have long desired—viz., compactness, simplicity of construction, very light in weight, so as to move it easily about in mining, and it delivers a powerful dead blow, more powerful and effective than any operation of a similar nature that I have ever seen in rock drills.

An important feature is the method of feeding your drill, wherein you make the cylinder its own feed-screw, thereby obtaining great strength and durability without increased weight. But the chief feature I observed in working your drill, and what I consider the most important, is that your drill does not take steam on the forward or striking end until after the blow is fully delivered upon the rock, a point that has never been introduced before in rock drills that I have seen or ever heard of.

I would unhesitatingly recommend your new drill above all others to parties interested in mining, tunnelling, &c.

Very respectfully,

**JOSEPH L. KOCHER,**  
Superintendent Newton Centre Tunnel, Boston Water Works.

**S. T. SHUTTLEWORTH,**

PATENTEE OF THE IMPROVED APPARATUS FOR PREVENTING  
INCURSTATION IN BOILERS, &c.  
MANUFACTURER OF SUPERIOR

GUN METAL STEAM COCKS, VALVES, BOILER MOUNTINGS,  
and CAST IRON STEAM and SAFETY VALVES, with GUN METAL SEATS  
ALL ORDERS PROMPTLY EXECUTED.

LONDON OFFICE,—51, BISHOPSGATE STREET WITHIN, E.C.

**VALVES AND STEAM COCKS.**

Cast-iron Steam Valve, with Gun Metal Seats, new and improved pattern.

(with flanges.)

(Screw Gland.) Gun Metal Screw Gland Steam Cock (black), shell pattern, female ends.

(Pin Gland.) Gun Metal Pin Gland Steam Cock (black), shell pattern, female ends—

Prices— $\frac{1}{4}$  in.  $\frac{3}{4}$  in.  $\frac{5}{8}$  in.  $\frac{1}{2}$  in.  $1\frac{1}{2}$  in.  $2\frac{1}{2}$  in.  $3\frac{1}{2}$  in.  $4\frac{1}{2}$  in.  $5\frac{1}{2}$  in.  $6\frac{1}{2}$  in.  $7\frac{1}{2}$  in.  $8\frac{1}{2}$  in.  $9\frac{1}{2}$  in.  $10\frac{1}{2}$  in.  $11\frac{1}{2}$  in.  $12\frac{1}{2}$  in.  $13\frac{1}{2}$  in.  $14\frac{1}{2}$  in.  $15\frac{1}{2}$  in.  $16\frac{1}{2}$  in.  $17\frac{1}{2}$  in.  $18\frac{1}{2}$  in.  $19\frac{1}{2}$  in.  $20\frac{1}{2}$  in.  $21\frac{1}{2}$  in.  $22\frac{1}{2}$  in.  $23\frac{1}{2}$  in.  $24\frac{1}{2}$  in.  $25\frac{1}{2}$  in.  $26\frac{1}{2}$  in.  $27\frac{1}{2}$  in.  $28\frac{1}{2}$  in.  $29\frac{1}{2}$  in.  $30\frac{1}{2}$  in.  $31\frac{1}{2}$  in.  $32\frac{1}{2}$  in. each.

(Screw Bottom.) Gun Metal Screw Bottom Steam Cock (black), shell pattern, female ends, or male and female ends—

Prices— $\frac{1}{4}$  in.  $\frac{3}{4}$  in.  $\frac{5}{8}$  in.  $\frac{1}{2}$  in.  $1\frac{1}{2}$  in.  $2\frac{1}{2}$  in.  $3\frac{1}{2}$  in.  $4\frac{1}{2}$  in.  $5\frac{1}{2}$  in.  $6\frac{1}{2}$  in.  $7\frac{1}{2}$  in.  $8\frac{1}{2}$  in.  $9\frac{1}{2}$  in.  $10\frac{1}{2}$  in.  $11\frac{1}{2}$  in.  $12\frac{1}{2}$  in.  $13\frac{1}{2}$  in.  $14\frac{1}{2}$  in.  $15\frac{1}{2}$  in.  $16\frac{1}{2}$  in.  $17\frac{1}{2}$  in.  $18\frac{1}{2}$  in.  $19\frac{1}{2}$  in.  $20\frac{1}{2}$  in.  $21\frac{1}{2}$  in.  $22\frac{1}{2}$  in.  $23\frac{1}{2}$  in.  $24\frac{1}{2}$  in.  $25\frac{1}{2}$  in.  $26\frac{1}{2}$  in.  $27\frac{1}{2}$  in.  $28\frac{1}{2}$  in.  $29\frac{1}{2}$  in.  $30\frac{1}{2}$  in. each.

(London Pattern.) Gun Metal Steam Cock, London shell pattern, polished bright, male and female ends; the heaviest in the trade—

$\frac{1}{4}$  in.  $\frac{3}{4}$  in.  $\frac{5}{8}$  in.  $\frac{1}{2}$  in.  $1\frac{1}{2}$  in.  $2\frac{1}{2}$  in.  $3\frac{1}{2}$  in.  $4\frac{1}{2}$  in.  $5\frac{1}{2}$  in.  $6\frac{1}{2}$  in.  $7\frac{1}{2}$  in.  $8\frac{1}{2}$  in.  $9\frac{1}{2}$  in.  $10\frac{1}{2}$  in.  $11\frac{1}{2}$  in.  $12\frac{1}{2}$  in.  $13\frac{1}{2}$  in.  $14\frac{1}{2}$  in.  $15\frac{1}{2}$  in.  $16\frac{1}{2}$  in.  $17\frac{1}{2}$  in.  $18\frac{1}{2}$  in.  $19\frac{1}{2}$  in.  $20\frac{1}{2}$  in.  $21\frac{1}{2}$  in.  $22\frac{1}{2}$  in.  $23\frac{1}{2}$  in.  $24\frac{1}{2}$  in.  $25\frac{1}{2}$  in.  $26\frac{1}{2}$  in.  $27\frac{1}{2}$  in.  $28\frac{1}{2}$  in.  $29\frac{1}{2}$  in.  $30\frac{1}{2}$  in. each.

The same with Flanges—

Gun Metal Ground Steam Union Joints—

$\frac{1}{4}$  in.  $\frac{3}{4}$  in.  $\frac{5}{8}$  in.  $\frac{1}{2}$  in.  $1\frac{1}{2}$  in.  $2\frac{1}{2}$  in.  $3\frac{1}{2}$  in.  $4\frac{1}{2}$  in.  $5\frac{1}{2}$  in.  $6\frac{1}{2}$  in.  $7\frac{1}{2}$  in.  $8\frac{1}{2}$  in.  $9\frac{1}{2}$  in.  $10\frac{1}{2}$  in.  $11\frac{1}{2}$  in.  $12\frac{1}{2}$  in.  $13\frac{1}{2}$  in.  $14\frac{1}{2}$  in.  $15\frac{1}{2}$  in.  $16\frac{1}{2}$  in.  $17\frac{1}{2}$  in.  $18\frac{1}{2}$  in.  $19\frac{1}{2}$  in.  $20\frac{1}{2}$  in.  $21\frac{1}{2}$  in.  $22\frac{1}{2}$  in.  $23\frac{1}{2}$  in.  $24\frac{1}{2}$  in.  $25\frac{1}{2}$  in.  $26\frac{1}{2}$  in.  $27\frac{1}{2}$  in.  $28\frac{1}{2}$  in.  $29\frac{1}{2}$  in.  $30\frac{1}{2}$  in. each.

Gun Metal Clack or Back Pressure Valve for Feed Pipes from Pumps or Injectors to Boilers—

$\frac{1}{4}$  in.  $\frac{3}{4}$  in.  $\frac{5}{8}$  in.  $\frac{1}{2}$  in.  $1\frac{1}{2}$  in.  $2\frac{1}{2}$  in.  $3\frac{1}{2}$  in.  $4\frac{1}{2}$  in.  $5\frac{1}{2}$  in.  $6\frac{1}{2}$  in.  $7\frac{1}{2}$  in.  $8\frac{1}{2}$  in.  $9\frac{1}{2}$  in.  $10\frac{1}{2}$  in.  $11\frac{1}{2}$  in.  $12\frac{1}{2}$  in.  $13\frac{1}{2}$  in.  $14\frac{1}{2}$  in.  $15\frac{1}{2}$  in.  $16\frac{1}{2}$  in.  $17\frac{1}{2}$  in.  $18\frac{1}{2}$  in.  $19\frac{1}{2}$  in.  $20\frac{1}{2}$  in.  $21\frac{1}{2}$  in.  $22\frac{1}{2}$  in.  $23\frac{1}{2}$  in.  $24\frac{1}{2}$  in.  $25\frac{1}{2}$  in.  $26\frac{1}{2}$  in.  $27\frac{1}{2}$  in.  $28\frac{1}{2}$  in.  $29\frac{1}{2}$  in.  $30\frac{1}{2}$  in. each.

Gun Metal Stuffing Box, Expansion Joints for long lengths of Piping—

$\frac{1}{4}$  in.  $\frac{3}{4}$  in.  $\frac{5}{8}$  in.  $\frac{1}{2}$  in.  $1\frac{1}{2}$  in.  $2\frac{1}{2}$  in.  $3\frac{1}{2}$  in.  $4\frac{1}{2}$  in.  $5\frac{1}{2}$  in.  $6\frac{1}{2}$  in.  $7\frac{1}{2}$  in.  $8\frac{1}{2}$  in.  $9\frac{1}{2}$  in.  $10\frac{1}{2}$  in.  $11\frac{1}{2}$  in.  $12\frac{1}{2}$  in.  $13\frac{1}{2}$  in.  $14\frac{1}{2}$  in.  $15\frac{1}{2}$  in.  $16\frac{1}{2}$  in.  $17\frac{1}{2}$  in.  $18\frac{1}{2}$  in.  $19\frac{1}{2}$  in.  $20\frac{1}{2}$  in.  $21\frac{1}{2}$  in.  $22\frac{1}{2}$  in.  $23\frac{1}{2}$  in.  $24\frac{1}{2}$  in.  $25\frac{1}{2}$  in.  $26\frac{1}{2}$  in.  $27\frac{1}{2}$  in.  $28\frac{1}{2}$  in.  $29\frac{1}{2}$  in.  $30\frac{1}{2}$  in. each.

Gun Metal Safety Valve, with Lever—

$\frac{1}{4}$  in.  $\frac{3}{4}$  in.  $\frac{5}{8}$  in.  $\frac{1}{2}$  in.  $1\frac{1}{2}$  in.  $2\frac{1}{2}$  in.  $3\frac{1}{2}$  in.  $4\frac{1}{2}$  in.  $5\frac{1}{2}$  in.  $6\frac{1}{2}$  in.  $7\frac{1}{2}$  in.  $8\frac{1}{2}$  in.  $9\frac{1}{2}$  in.  $10\frac{1}{2}$  in.  $11\frac{1}{2}$  in.  $12\frac{1}{2}$  in.  $13\frac{1}{2}$  in.  $14\frac{1}{2}$  in.  $15\frac{1}{2}$  in.  $16\frac{1}{2}$  in.  $17\frac{1}{2}$  in.  $18\frac{1}{2}$  in.  $19\frac{1}{2}$  in.  $20\frac{1}{2}$  in.  $21\frac{1}{2}$  in.  $22\frac{1}{2}$  in.  $23\frac{1}{2}$  in.  $24\frac{1}{2}$  in.  $25\frac{1}{2}$  in.  $26\frac{1}{2}$  in.  $27\frac{1}{2}$  in.  $28\frac{1}{2}$  in.  $29\frac{1}{2}$  in.  $30\frac{1}{2}$  in. each.

Gun Metal Steam Whistle—

$\frac{1}{4}$  in.  $\frac{3}{4}$  in.  $\frac{5}{8}$  in.  $\frac{1}{2}$  in.  $1\frac{1}{2}$  in.  $2\frac{1}{2}$  in.  $3\frac{1}{2}$  in.  $4\frac{1}{2}$  in.  $5\frac{1}{2}$  in.  $6\frac{1}{2}$  in.  $7\frac{1}{2}$  in.  $8\frac{1}{2}$  in.  $9\frac{1}{2}$  in.  $10\frac{1}{2}$  in.  $11\frac{1}{2}$  in.  $12\frac{1}{2}$  in.  $13\frac{1}{2}$  in.  $14\frac{1}{2}$  in.  $15\frac{1}{2}$  in.  $16\frac{1}{2}$  in.  $17\frac{1}{2}$  in.  $18\frac{1}{2}$  in.  $19\frac{1}{2}$  in.  $20\frac{1}{2}$  in.  $21\frac{1}{2}$  in.  $22\frac{1}{2}$  in.  $23\frac{1}{2}$  in.  $24\frac{1}{2}$  in.  $25\frac{1}{2}$  in.  $26\frac{1}{2}$  in.  $27\frac{1}{2}$  in.  $28\frac{1}{2}$  in.  $29\frac{1}{2}$  in.  $30\frac{1}{2}$  in. each.

Single Tallow Cock—

$\frac{1}{4}$  in.  $\frac{3}{4}$  in.  $\frac{5}{8}$  in.  $\frac{1}{2}$  in.  $1\frac{1}{2}$  in.  $2\frac{1}{2}$  in.  $3\frac{1}{2}$  in.  $4\frac{1}{2}$  in.  $5\frac{1}{2}$  in.  $6\frac{1}{2}$  in.  $7\frac{1}{2}$  in.  $8\frac{1}{2}$  in.  $9\frac{1}{2}$  in.  $10\frac{1}{2}$  in.  $11\frac{1}{2}$  in.  $12\frac{1}{2}$  in.  $13\frac{1}{2}$  in.  $14\frac{1}{2}$  in.  $15\frac{1}{2}$  in.  $16\frac{1}{2}$  in.  $17\frac{1}{2}$  in.  $18\frac{1}{2}$  in.  $19\frac{1}{2}$  in.  $20\frac{1}{2}$  in.  $21\frac{1}{2}$  in.  $22\frac{1}{2}$  in.  $23\frac{1}{2}$  in.  $24\frac{1}{2}$  in.  $25\frac{1}{2}$  in.  $26\frac{1}{2}$  in.  $27\frac{1}{2}$  in.  $28\frac{1}{2}$  in.  $29\frac{1}{2}$  in.  $30\frac{1}{2}$  in. each.

Double Tallow Cock—

$\frac{1}{4}$  in.  $\frac{3}{4}$  in.  $\frac{5}{8}$  in.  $\frac{1}{2}$  in.  $1\frac{1}{2}$  in.  $2\frac{1}{2}$  in.  $3\frac{1}{2}$  in.  $4\frac{1}{2}$  in.  $5\frac{1}{2}$  in.  $6\frac{1}{2}$  in.  $7\frac{1}{2}$  in.  $8\frac{1}{2}$  in.  $9\frac{1}{2}$  in.  $10\frac{1}{2}$  in.  $11\frac{1}{2}$  in.  $12\frac{1}{2}$  in.  $13\frac{1}{2}$  in.  $14\frac{1}{2}$  in.  $15\frac{1}{2}$  in.  $16\frac{1}{2}$  in.  $17\frac{1}{2}$  in.  $18\frac{1}{2}$  in.  $19\frac{1}{2}$  in.  $20\frac{1}{2}$  in.  $21\frac{1}{2}$  in.  $22\frac{1}{2}$  in.  $23\frac{1}{2}$  in.  $24\frac{1}{2}$  in.  $25\frac{1}{2}$  in.  $26\frac{1}{2}$  in.  $27\frac{1}{2}$  in.  $28\frac{1}{2}$  in.  $29\frac{1}{2}$  in.  $30\frac{1}{2}$  in. each.

Gun Metal Throttle Valves, screwed for iron pipe—

$\frac{1}{4}$  in.  $\frac{3}{4}$  in.  $\frac{5}{8}$  in.  $\frac{1}{2}$  in.  $1\frac{1}{2}$  in.  $2\frac{1}{2}$  in.  $3\frac{1}{2}$  in.  $4\frac{1}{2}$  in.  $5\frac{1}{2}$  in.  $6\frac{1}{2}$  in.  $7\frac{1}{2}$  in.  $8\frac{1}{2}$  in.  $9\frac{1}{2}$  in.  $10\frac{1}{2}$  in.  $11\frac{1}{2}$  in.  $12\frac{1}{2}$  in.  $13\frac{1}{2}$  in.  $14\frac{1}{2}$  in.  $15\frac{1}{2}$  in.  $16\frac{1}{2}$  in.  $17\frac{1}{2}$  in.  $18\frac{1}{2}$  in.  $19\frac{1}{2}$  in.  $20\frac{1}{2}$  in.  $21\frac{1}{2}$  in.  $22\frac{1}{2}$  in.  $23\frac{1}{2}$  in.  $24\frac{1}{2}$  in.  $25\frac{1}{2}$  in.  $26\frac{1}{2}$  in.  $27\frac{1}{2}$  in.  $28\frac{1}{2}$  in.  $29\frac{1}{2}$  in.  $30\frac{1}{2}$  in. each.

Gun Metal Pet Cocks, with cleaning screw—

$\frac{1}{4}$  in.  $\frac{3}{4}$  in.  $\frac{5}{8}$  in.  $\frac{1}{2}$  in.  $1\frac{1}{2}$  in.  $2\frac{1}{2}$  in.  $3\frac{1}{2}$  in.  $4\frac{1}{2}$  in.  $5\frac{1}{2}$  in.  $6\frac{1}{2}$  in.  $7\frac{1}{2}$  in.  $8\frac{1}{2}$  in.  $9\frac{1}{2}$  in.  $10\frac{1}{2}$  in.  $11\frac{1}{2}$  in.  $12\frac{1}{2}$  in.  $13\frac{1}{2}$  in.  $14\frac{1}{2}$  in.  $15\frac{1}{2}$  in.  $16\frac{1}{2}$  in.  $17\frac{1}{2}$  in.  $18\frac{1}{2}$  in.  $19\frac{1}{2}$  in.  $20\frac{1}{2}$  in.  $21\frac{1}{2}$  in.  $22\frac{1}{2}$  in.  $23\frac{1}{2}$  in.  $24\frac{1}{2}$  in.  $25\frac{1}{2}$  in.  $26\frac{1}{2}$  in.  $27\frac{1}{2}$  in.  $28\frac{1}{2}$  in.  $29\frac{1}{2}$  in.  $30\frac{1}{2}$  in. each.

Gun Metal Blow-off Cocks—

$\frac{1}{4}$  in.  $\frac{3}{4}$  in.  $\frac{5}{8}$  in.  $\frac{1}{2}$  in.  $1\frac{1}{2}$  in.  $2\frac{1}{2}$  in.  $3\frac{1}{2}$  in.  $4\frac{1}{2}$  in.  $5\frac{1}{2}$  in.  $6\frac{1}{2}$  in.  $7\frac{1}{2}$  in.  $8\frac{1}{2}$  in.  $9\frac{1}{2}$  in.  $10\frac{1}{2}$  in.  $11\frac{1}{2}$  in.  $12\frac{1}{2}$  in.  $13\frac{1}{2}$  in.  $14\frac{1}{2}$  in.  $15\frac{1}{2}$  in.  $16\frac{1}{2}$  in.  $17\frac{1}{2}$  in.  $18\frac{1}{2}$  in.  $19\frac{1}{2}$  in.  $20\frac{1}{2}$  in.  $21\frac{1}{2}$  in. <

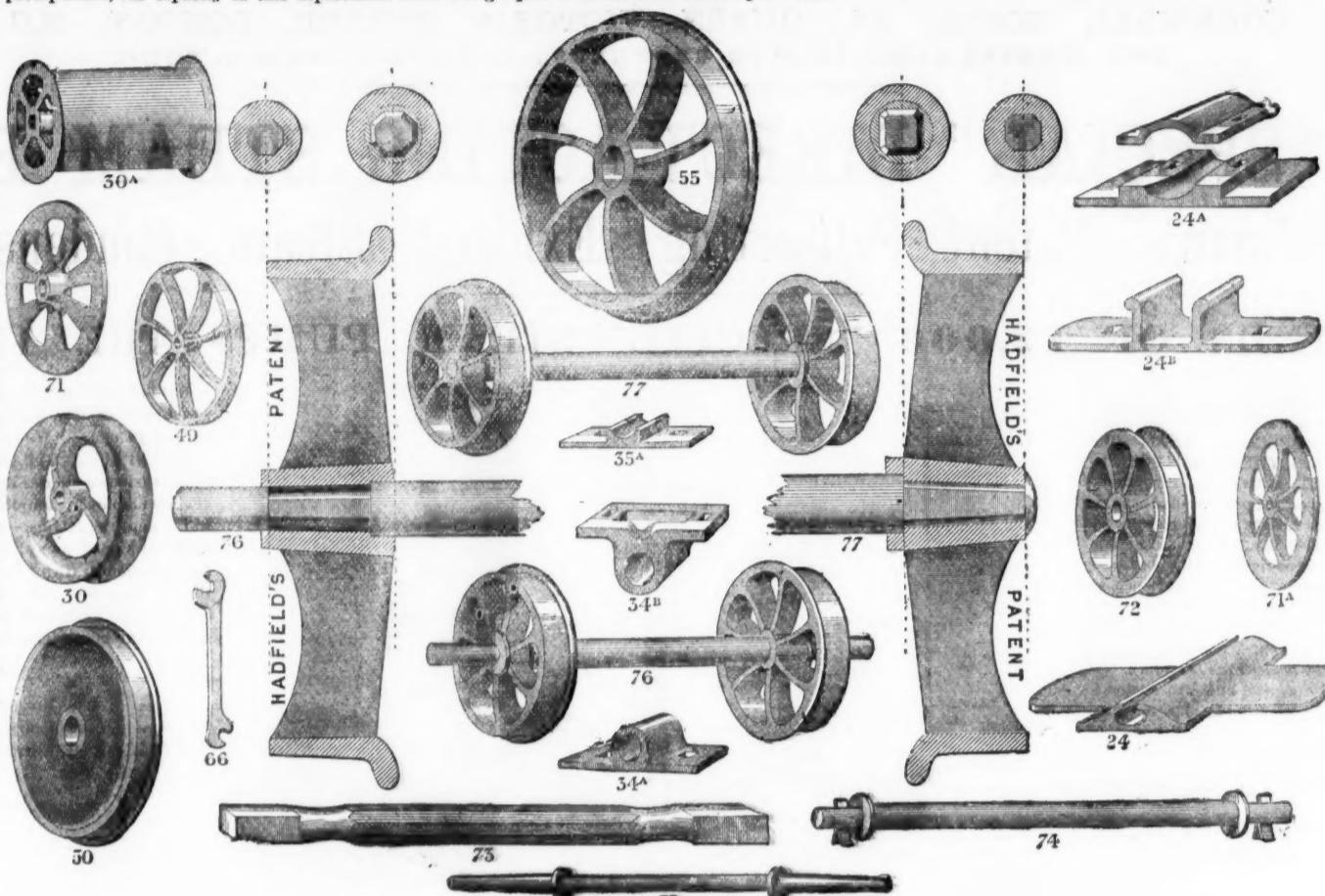
AWARDED THE PRIZE MEDALS AT LEEDS, MANCHESTER, AND WREXHAM EXHIBITIONS, 1875 AND 1876.

# HADFIELD'S STEEL FOUNDRY COMPANY,

ATTERCLIFFE, SHEFFIELD,  
DEVOTE THEIR EXCLUSIVE ATTENTION TO THE MANUFACTURE OF  
CRUCIBLE STEEL CASTINGS, for Engineering and Machine Purposes,  
AND ARE THE SOLE MAKERS OF  
**HADFIELD'S CRUCIBLE STEEL WHEELS.**

One of our departments is specially adapted for the manufacture of these Wheels (as shown below), for Collieries, Ironstone Mines, Slate Quarries, Ironworks, Lead Mines, &c., &c. We have made, and are now making, many HUNDRED THOUSANDS; and having Patented a New Method of Fitting Wheels upon axles, being cheap, effective, and expeditious, we can execute orders entrusted to us with promptitude, our capacity in this department alone being equal to about 2000 wheels per week.

N.B.—Prices per Set of Wheels and Axles, fitted complete, forwarded on receipt of diameter of wheel on tread, depth of tread, rear gauge, and thickness of axles and rolling load.



*This Sheet of Drawings is Copyright.*

## HADFIELD'S PATENT METHOD OF FITTING WHEELS UPON AXLES.

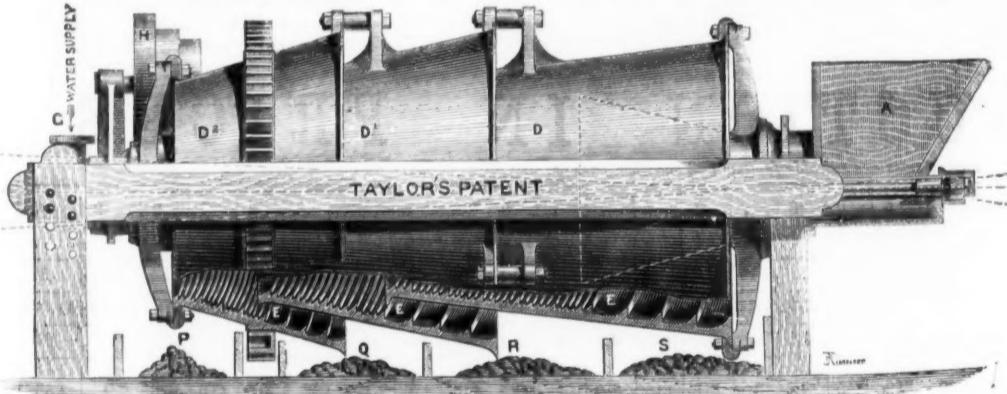
The advantages of the above system are that the Wheels being forced upon a Taper Square-ended Axle, by Machinery, and then riveted (the machine securing truth), it is impossible that they can come loose or get within gauge. They are very heavily fitted on, and run exceedingly true.

We construct the Arms of wheels upon the curved principle (as shown in the drawings above), consequently the shrinkage or cooling of the Castings is not interfered with, thus securing the greatest advantages of our very strong material.

CRUCIBLE CAST-STEEL WHEELS, when cast by us, are made from one-third to one-half lighter than Cast-Iron. They cannot be broken while working, even with rough usage, and will wear at least twelve times as long as Cast-Iron, thus saving animal and steam power, and reducing wear and tear immensely.

We would also draw special attention to our INCLINE PULLEYS and CAGE GUIDES, the adoption of which will prove highly advantageous.

FIRST SILVER MEDAL AWARDED BY THE ROYAL CORNWALL POLYTECHNIC SOCIETY, 1876.



## TAYLOR'S PATENT DRUM DRESSER,

FOR SEPARATING AND SIZING MINERAL AND OTHER SUBSTANCES.

By the aid of this invention any materials, which are of different specific gravity, can be concentrated and sorted mechanically, while in the case of ores the fine mineral is brought up with the larger particles instead of being washed into the waste—a most important feature.

This machine uses very little water in proportion to the quantity of material treated, and will be found a most useful and efficient dressing apparatus.

For further particulars, and to see machines at work, apply to the Patentee,

H. E. TAYLOR, 15. Newgate Street, Chester.

## MANCHESTER WIRE WORK.

NEAR VICTORIA STATION, MANCHESTER

(ESTABLISHED 1790).

JOHN STANIAR AND CO.,

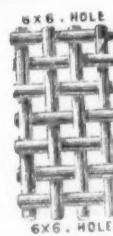
Manufacturers by STEAM POWER of all kinds of Wire Web, EXTRA TREBLE STRONG for

LEAD AND COPPER MINES.

Jigger Bottoms and Cylinder Covers woven ANY WIDTH, in Iron, Steel, Brass, or Copper

EXTRA STRONG PERFORATED ZINC AND COPPER RIDDLES AND SIEVES.

Shipping Orders Executed with the Greatest Dispatch.



## IMPROVED IRON

SMITH'S

NO BRICKWORK

PRICES FROM

£6.15. NETT.

FREE on G.N.R.

GILDERSOME.

R. HUDSON.

GILDERSOME FOUNDRY,

NEAR LEEDS

HEARTH.

REQUIRED.

CAN BE TAKEN DOWN  
& SET UP AGAIN  
IN  $\frac{1}{2}$  AN HOUR.

GILDERSOME.

R. HUDSON.

GILDERSOME FOUNDRY,

NEAR LEEDS

GREAT SAVING IN ROOM.

## BENNETT'S SAFETY FUSE WORKS, ROSKEAR, CAMBORNE, CORNWALL.

### BLASTING FUSE FOR MINING AND ENGINEERING PURPOSES.

Suitable for wet or dry ground, and effective in Tropical or Polar Climates.

W. BENNETT, having had many years experience as chief engineer with Messrs. Bickford, Smith, and Co., is now enabled to offer Fuse of every variety of his own manufacture, of best quality, and at moderate prices.

Price Lists and Sample Cards may be had on application at the above address.

LONDON OFFICE.—H. HUGHES, Esq., 45, GRACECHURCH STREET.

TO COLLIERY AND MINE OWNERS, ENGINEERS, IRONFOUNDERS  
AND CONTRACTORS, &c.

JAMES AND KNOTT,  
DARLINGTON.

Are now in a position to SUPPLY their "SPECIAL" LUBRICATING OIL, PAINTS, PAINT OILS AND VARNISHES of all kinds, TALLOW, SPUN YARNS, GREASE, COTTON WASTE, LEATHER BELTING, INDIA-RUBBER GOODS and STEAM PACKING, NAILS, BOLTS, RIVETS, VICES, &c., from stock, in large or small quantities, on receipt of orders.

Quotations given for new and secondhand machinery or stores, &c., on application to—

JAMES AND KNOTT, COLLIERY AND ENGINEERS' STORE  
DARLINGTON.



PARIS INTERNATIONAL EXHIBITION, 1867.



VIENNA INTERNATIONAL EXHIBITION, 1873.



LONDON INTERNATIONAL EXHIBITION, 1874.



CORNWALL POLYTECHNIC SOCIETY, 1867 and 1873.

# TANGYE BROTHERS AND HOLMAN,

HYDRAULIC AND GENERAL ENGINEERS,

CORNWALL HOUSE, 35, QUEEN VICTORIA STREET, LONDON, E.C.,  
AND BIRMINGHAM, (TANGYE BROTHERS), CORNWALL WORKS, SOHO.

## The "SPECIAL" DIRECT-ACTING STEAM PUMP, WITH Holman's Patent Self-acting Exhaust Steam Condensers.

UPWARDS OF 12,000 "SPECIAL" STEAM PUMPS ARE IN USE.

After eight years of successful application for all purposes to which steam-driven pumps can be applied, THE "SPECIAL" STEAM PUMP STILL MAINTAINS THE FIRST POSITION IN THE MARKET, notwithstanding that it alone—of all direct-acting pumps—has been subjected to the great variety of severe tests that must be encountered in such a period of time. Some valuable improvements have been suggested in the course of a long experience, and their adoption has rendered the apparatus at once the simplest and most certain in action. There is absolutely no extraneous gear, and the steam cylinder is no longer than the pump. The valves are of easy access, and are suited for pumping fluids and semi-fluids of almost any consistency.

### Holman's Condenser

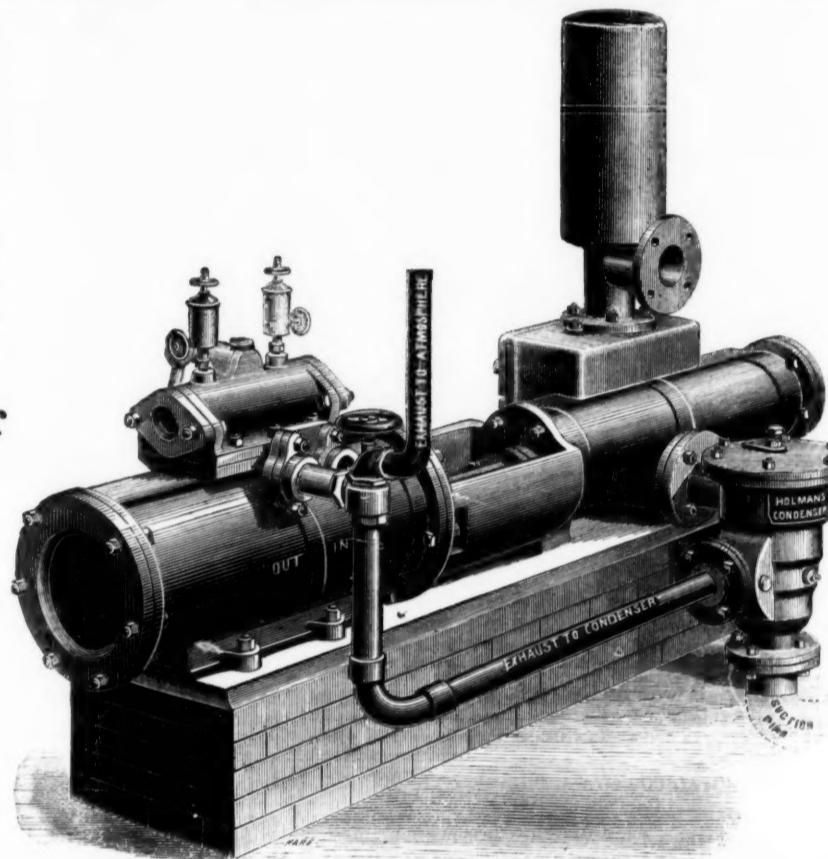
TURES WASTE STEAM INTO GREAT POWER.

SAVES HALF ITS COST IN PIPES AND CONNECTIONS.

PREVENTS ALL ESCAPE OF STEAM IN MINES OR ELSEWHERE.

REQUIRES NO EXTRA SPACE.

SAVES TWENTY TO FIFTY PER CENT. OF FUEL.



WILLIAM ELLIOT, Esq., of the Weardale Iron and Coal Company, writes under date Sept. 17th, 1875, as follows:—"We have now THIRTY-FIVE of your SPECIAL STEAM PUMPS in operation at the various collieries under my charge—some of them employed pumping water out of our pits to the depth of 50 fms.—others employed in the pits, and a good many feeding Boilers. I have no hesitation in saying that we have found them the Cheapest and Best Pumps of the kind we have tried. I can with confidence recommend them to intending purchasers."

Messrs. BURT, BOULTON, and HAYWOOD, Chemical Manufacturers, of London, have FORTY of the "SPECIAL" STEAM PUMPS in use at their works.

### HOLMAN'S CONDENSERS

Are made to suit any size and kind of Steam Pump. They form a part of the suction pipe of the Pump, and while they effectually condense the exhaust steam they produce an average vacuum of 10 lbs. per square inch on the steam piston, increasing the duty of the Engine, and effecting a saving in fuel of from 20 to 50 per cent.

In Mining operations these Condensers will be of great value.

All Boiler Feeders are recommended to be fitted with these Condensers, as not only is the exhaust steam utilised in heating the feed water, but is returned with it into the boiler.

## GREAT REDUCTION IN PRICES.

The following sizes are suitable for low and medium lifts:—

Diameter of Steam Cylinder ...In.	3	4	4	4	5	5	6	6	6	7	7	7	7	8	8	8	8	8	9	9	9	9	9	10	10						
Diameter of Water Cylinder ...In.	1½	2	3	4	3	4	5	3	4	5	6	3	4	5	6	7	4	5	6	7	8	5	6	7	8	9	5	6			
Length of Stroke .....In.	9	9	9	9	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	18	12	12	12	18	24	12	12			
Gallons per hour .....	680	815	1830	3250	1830	3250	5070	1830	3250	5070	7330	1830	3250	5070	7330	9750	3250	5070	7330	9750	13,000	5070	7330	9750	13,000	16,500	5070	7330			
Price of Special Pump ...£	16	18	20	25	22	10	27	10	32	10	25	30	35	40	30	35	40	45	50	40	45	50	55	65	50	55	60	70	85	55	60
Extra, if fitted with Holman's Condenser and Blow-through Valve .....	£7	£7	£9	£11	£8	10	£11	10s	£12	10s	£9	£12	£15	£15	£10	£13	£15	£16	£22	£13	£16	£16	£22	£22	£16	£16	£23	£24	£35	£17	£17

CONTINUED.

Diameter of Steam Cylinder...In.	10	10	10	10	12	12	12	12	14	14	14	14	14	14	14	16	16	16	16	16	16	18	18	18	18	18	18	18				
Diameter of Water Cylinder...In.	7	8	9	10	6	7	8	9	10	12	7	8	9	10	12	14	8	9	10	12	14	9	10	12	14	12	14					
Length of Stroke ...In.	12	18	24	24	18	18	18	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24			
Gallons per hour .....	9750	13,000	16,519	20,000	7330	9750	13,000	16,519	20,000	30,000	9750	13,000	16,519	20,000	30,000	40,000	13,000	16,519	20,000	30,000	40,000	16,519	20,000	30,000	40,000	16,519	20,000	30,000	40,000	16,519	20,000	
Price of Special Pump...£	65	75	90	100	75	80	85	110	120	140	110	120	130	140	160	180	140	150	160	180	200	180	190	210	230	180	200	220	240	260	280	
Extra, if fitted with Holman's Condenser and Blow-through Valve .....	£23	£24	£35	£35	£20	£27	£27	£38	£38	£50	£28	£28	£40	£40	£55	£28	40	£40	£55	£45	£45	£55	£45	£55	£45	£55	£45	£55	£45	£55	£45	£55

Intending purchasers of Steam Pumps would do well to observe the great length of stroke, short steam cylinder, and short piston of the "Special" Steam Pump, as compared with the short stroke, long steam cylinder, and long piston of the Pumps of other makers, as the efficiency and durability of the machine, and the space occupied by same, greatly depend upon this. The advantage of long strokes will be obvious when purchasers are reminded that each set of suction and delivery valves of a "Special" Steam Pump with 24 in. stroke, running at 120 ft. per minute, would open and close only 30 times per minute, as against 120 times per minute in a Pump with only 6 in. stroke performing same duty.

The "Special" Steam Pump can be worked by Compressed Air as well as by Steam.

HUNDREDS of these PUMPS are USED for HIGH LIFTS IN MINES, for which purpose they are made with 21, 24, 26, 28, 30, and 32-inch Steam Cylinders, and 36, 48 and 72-inch Strokes.

The following Testimonial gives one Example of the Power Gained by the action of Holman's Patent Condensers:—

NORLEY COLLIERY, WIGAN.

The perfect manner in which this important result is accomplished by your Condenser is extremely creditable to you, and merits the thanks and commendation of the Mining Engineer. When we start the "Special" Steam Pump the Condenser commences working automatically, and maintains a constant vacuum of 10½ lbs. per square inch, even when we run the Pump upwards of 80 strokes (106 feet) per minute. It may perhaps be interesting to you to know that when we were running the Pump at 84 strokes (168 feet) per minute, the steam gauge indicating a steam pressure of 36 lbs. per square inch, 80 yards from the Pump, and the Condenser vacuum gauge on the exhaust pipe indicating a steady vacuum of 21½ inches, I turned the exhaust steam from the Condenser into the atmosphere, when the speed at once fell to 44 strokes per minute. The working economy thus shown is really so great that the cost of the Condenser must be saved in a very short time.

(Signed)

J. THOMPSON.

NORTH OF ENGLAND HOUSE  
SOUTH WALES HOUSE ...

TANGYE BROTHERS AND RAKE, ST. NICHOLAS BUILDINGS, NEWCASTLE-ON-TYNE.  
TANGYE BROTHERS AND STEEL, Tredegar Place, NEWPORT, Mon.; and Oxford Buildings, SWANSEA.

# STEAM BOILERS

OF ALL KINDS MADE TO ORDER AT THE SHORTEST NOTICE BY THE

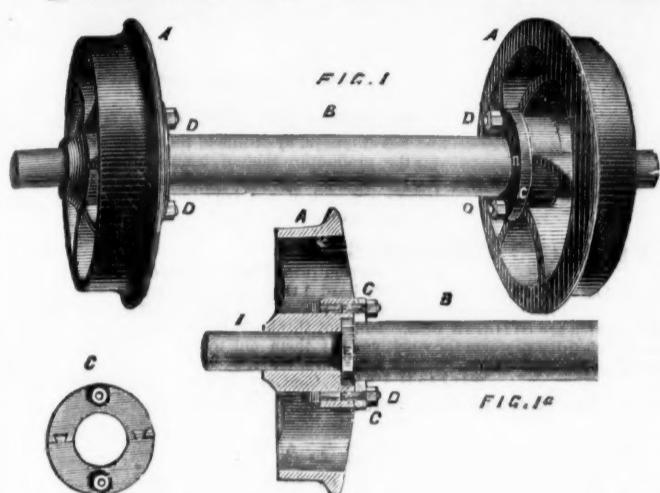
TURNBRIDGE IRON & BOILER WORKS COMPANY, LIMITED, HUDDERSFIELD.  
London Agent—Mr. W. PARSEY, 46, FISH STREET HILL, E.C.

**JOSEPH FENTON & SONS,**  
**SYKES WORKS, SHEFFIELD, and 118, Cannon-street, LONDON, E.C.,**

MANUFACTURERS OF  
**CRUCIBLE CAST STEEL CASTINGS,**

HAVE PLEASURE IN CALLING THE ATTENTION OF THE MINING WORLD TO THEIR

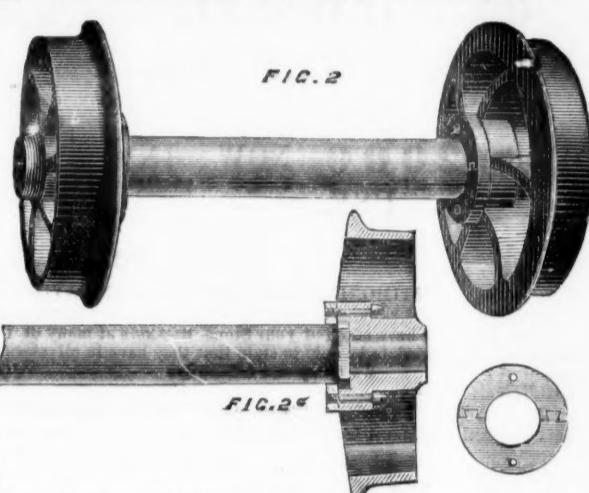
Patent Method of Fitting up Cast Steel Wheels and Axles.



Figs. 1 and 1a show a longitudinal view and plan of a pair of cast wheels fitted up for outside bearings. A A are the wheels; B is the axle; C, the washers; D D, the bolts; E, the collar on axle B; and F, the recessed boss in the wheel.

The wheel is cast with a recessed boss in the inside, made to any shape, corresponding in shape and depth with a collar formed on the axle. Figs. 2 and 2a show a longitudinal view and plan of a pair of cast wheels fitted up for inside bearings. The washers are secured to the boss of the wheel in outside bearings by bolts and nuts, and in inside bearings by set screws.

The advantages of the above system are:—A, the singular simplicity of fitting—enabling any inexperienced person, with the aid of a spanner or screw-driver, to detach the wheels from the axle or fit them together in a very short time. B, perfect solidity, the wheels and axles becoming as one-piece. C, durability, no need or putting the wheels or axles into the fire, under any circumstances, which is so detrimental to wheels, rendering them remarkably brittle, and which under other systems are detached from the axle by the aid of fire. D, economy in fuel and wages, saving hundreds of pounds yearly to large coal owners. The



important desiderata secured by this invention of simplicity (so often wanted in patents), solidity, durability, and economy, have not only been amply illustrated by the technical journals interested in the progress of mining operations in this country, but have at once been fully recognised by leading authorities in the mining world.

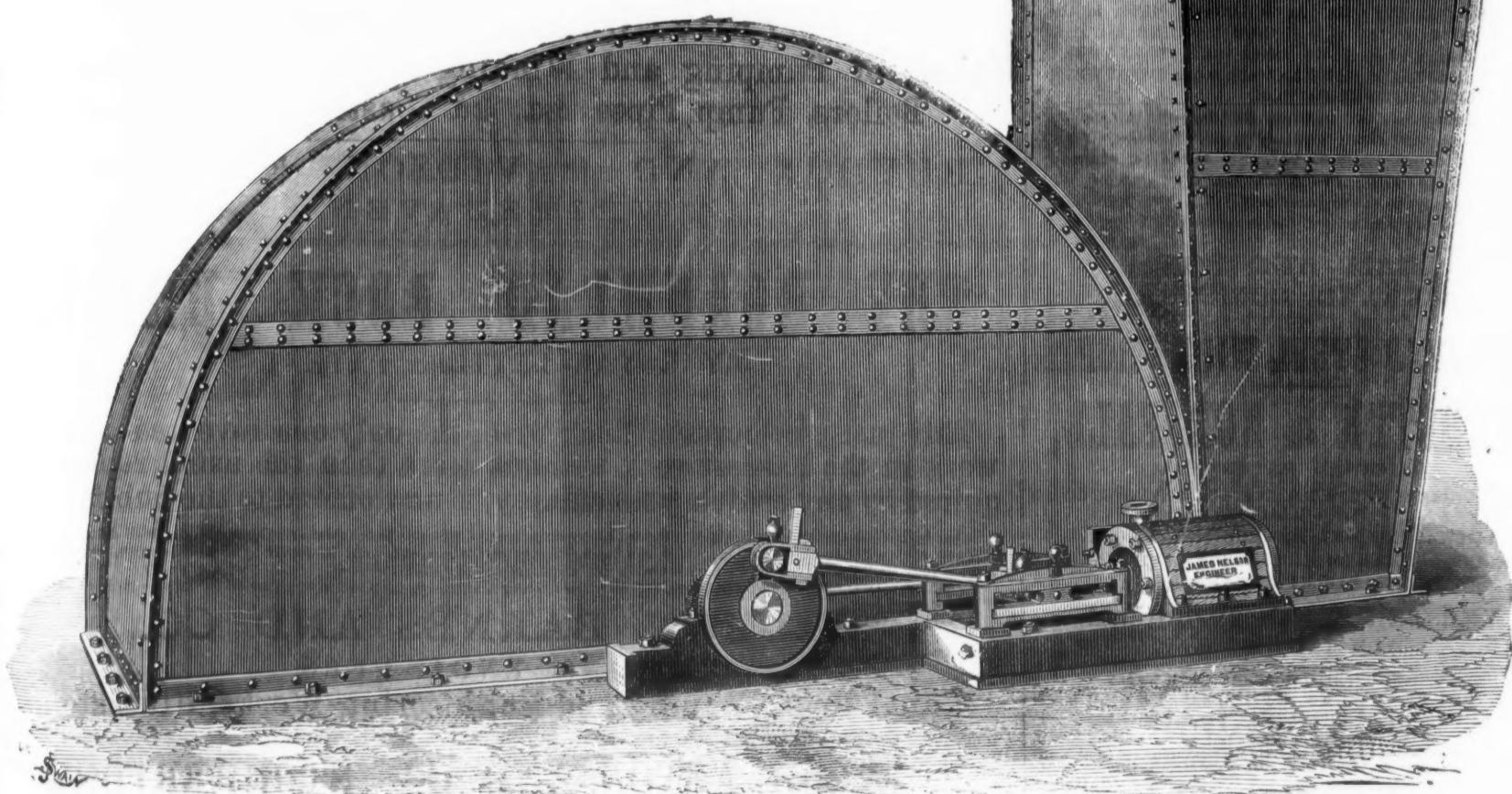
## GUIBAL VENTILATING FAN FOR COLLIERIES AND MINES.

PRICES AND PARTICULARS ON APPLICATION.

All sizes up to 40 ft. in stock or progress.

Engines of the most approved class for driving.

Boilers and Ironwork of every description.



MANUFACTURED BY

**JAMES NELSON, Marine and Stationary Engine Works,  
GATESHEAD-ON-TYNE.**

# H. R. MARSDEN, PATENTEE AND ONLY MAKER BLAKE MACHINES, ORE CRUSHERS AND STONE BREAKERS,

OF THE WELL-KNOWN

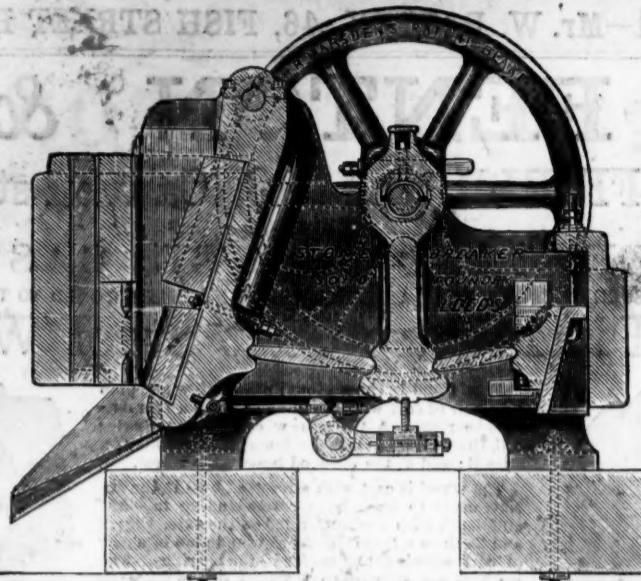
WITH THE  
New Patent Reversible  
CRUSHING OR CUBING  
JAWS,

WHICH ARE CONSTRUCTED OF A PECULIAR  
MIXTURE OF METAL, WEARING

Four times longer than any  
other.

**60 GOLD AND  
SILVER MEDALS.**

OVER 2000 NOW IN  
USE.



For Crushing to any degree  
of Fineness, or Breaking  
to a required size.

Her Majesty's Government  
USE THESE MACHINES  
EXCLUSIVELY,  
ALSO ALL THE GREAT  
Mining Companies of the  
World.

H. R. M. has long observed the want of cheaper  
machines,

**STONE AND ORE CRUSHERS,**  
And has at length, by means of improved appliances  
for the production thereof, been enabled to reduce  
the prices, yet keep up at the same time the well-known  
strength of construction. Reduced prices  
on application.

Royal Agricultural Show, Liverpool, July, 1877.

TESTIMONIAL FROM MESSRS. JOHN TAYLOR AND SONS.  
6, Queen-street-place, May 10, 1877.  
DEAR SIR.—We have adopted your Stone Breakers at many of the mines under our management, and are pleased to be able to state that they have in all cases given the greatest satisfaction. We are, yours faithfully,

JOHN TAYLOR AND SONS.

INTENDING BUYERS ARE CAUTIONED AGAINST PURCHASING OR USING ANY INFRINGEMENT OF THE NUMEROUS PATENTS OF H. R. MARSDEN.  
ILLUSTRATED CATALOGUES, TESTIMONIALS, and every information, on application to—

**H. R. MARSDEN, SOHO FOUNDRY, LEEDS, ENGLAND.**  
ONLY MAKER OF SAULT'S PATENT SYPHON CONDENSER.

**R. HUDSON'S PATENT STEEL CORVES OR "TRAMS."**

Patented July, 1875, and January, 1877.

Entire new principle, saving three-quarters to 2 cwt. "dead" weight per corve. Will hold 2 to 3 cwt. more coal than the ordinary kind, without increasing the outside dimensions. Adopted by—  
MESSRS. THOMPSON, WISE, & CO., Bury Port, South Wales.  
MESSRS. DYMOND'S Liversedge Coal Company, near Leeds.  
MESSRS. W. ACKROYD AND BROS., Morley, near Leeds.  
MESSRS. CLAYTON AND SPEIGHT, Farnley, near Leeds.  
MESSRS. JAS. WORMALL AND SONS, Rawdon, near Leeds.  
KINGSWOOD COAL AND IRON CO., near Bristol.  
MIDDLETON COLLERY CO., near Leeds. | NEWTON COLLERY, near Castleford. | MESSRS. RUSHFORTH AND CO., Adwalton, near Leeds. | MESSRS. JAS. FUSSELL, SONS, and CO., Frome, Somersetshire.  
T. VAUGHAN AND CO.'S TRUSTEES, South Medomsley Colliery; and others.

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